FEB. 17
1955

ENGINEERING NEWS-RECORD

ANNUAL REPORT AND FORECAST

The appeal of construction as a vocation offering the satisfaction of service and the excitement of accomplishment was never stronger. And the reason rests only secondarily in the welter of predictions for prosperity during the next twelve months. It is the farther horizons, glowing with new opportunities, that exert the greatest impact. What happens this year is important, but it is the long look ahead, say twenty years, that furnishes the ultimate thrill of worthwhile objectives. This annual report attempts to bring both of these futures into focus.

Continued on page 51 . . .

THIS ISSUE
$2.00

Oliver "OC-12" with hydraulic 1-yd. loader. This model has the long track frame for added stability. Loader has exceptional bucket rotation and 10' 4" loading height.

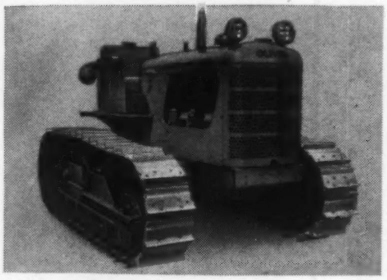
Another great tractor by Oliver ...THE POWERFUL "OC-12" CRAWLER!

It's a rugged, eager worker in the 45 drawbar h.p. class that features advancements in power, economy and operating ease to make every job more profitable.

The "OC-12" offers two engines of exceptional torque span—diesel or gasoline. Both engines have instant electric starting, pressure cooling, by-pass thermostat and full-flow oil system to insure quick starting and long, low-cost service.

The smooth lines of this unit show it is made for easy access and operator visibility. Controls are right where they're the handiest. Down to the key-lock switch, foam rubber seat, overhead-linkage clutch, this tractor caters to operator convenience.

Your Oliver Industrial Distributor will be glad to demonstrate the "OC-12." Give him a call.



The "OC-12" is available in two track widths: 44- and 60-inch—and two track lengths, one with four lower track wheels and one with five. Standard grousers are 14-inch.

Here is the "OC-12" with hydraulic bulldozer. Hydraulic pump is front mounted. Special protective grille is part of 'dozer frame. Blade has provision for tilt adjustment.

THE OLIVER CORPORATION
400 W. Madison Street, Chicago 6, Illinois

THE OLIVER CORPORATION

a complete line of industrial wheel and crawler tractors

Bethlehem reinforcing bars in place on the new section of Philadelphia's Roosevelt Boulevard bridge at Second St. The bridge was widened to accommodate twelve lanes of traffic. *General Contractor:* Francis A. Canuso and Sons, Philadelphia. Steel was installed by L and R Construction Co., Haddon Heights, N. J.

Bridge-Widening Eases Traffic Snarls on Busy Philadelphia Boulevard

Traffic on Philadelphia's Roosevelt Boulevard used to get into rush-hour snarls at several bridges, where the Boulevard's twelve lanes of traffic converged on to the bridges' six lanes. Now, thanks to the widening of these bridges to twelve lanes, traffic will proceed at a better pace.

The bridge at Second St., shown here during construction, was widened on both sides, so that the finished structure will have two three-lane local traffic arteries and two three-lane expressways in the center, separated by an 80-ft cement island.

Bethlehem supplied 320 tons of fabricated reinforcing bars for the Second St. bridge and a total of 2100 tons of bars for all six bridges. The bars were specially bent and formed for the job at our Philadelphia bar fabricating shop.

Bethlehem has had years of experience in furnishing reinforcing steel to contractors. Bethlehem bars, made from new-billet steel to ASTM Specification A-305, are shipped completely fabricated from whichever of our eleven bar fabricating shops is nearest your job site.

And you can be sure that your Bethlehem reinforcing bars will reach the job site on time. From the start of placing plans to delivery, Bethlehem gives you quick service. Bars reach you promptly, bundled and tagged, and ready for placing.

Eleven Bethlehem Fabricating Shops at Your Service

Boston **Johnstown, Pa.** **Chicago**
New York **Baltimore** **St. Paul**
Philadelphia **Buffalo** **Los Angeles**
San Francisco **Seattle**

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Bethlehem **REINFORCING BARS**

TOMORROW'S
INSTRUMENT
TODAY!
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HEERBRUGG

WILD T-2 UNIVERSAL THEODOLITE

In arctic cold or tropical heat . . . under all climatic conditions, the universal favorite for triangulation, bridgework and other precise engineering jobs. Known for effortless, high precision operation the world over. The instrument for YOU Today!

You read both circles by microscope (adjacent to telescope) . . . direct to one second. Every reading gives the mean of two diametrically opposite points of the circle, and is therefore free from eccentricity-errors.

The optical plummet makes centering above a ground point an easy and quick operation even on windy days. The telescope with its big field of view is "easy on the eye" and can be transited both ways.

Available accessories include battery box for night work, traverse targets, Invar Subtense Bar for optical distance measurement.

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Choose WILD instruments for ease of operation, speed and accuracy.

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Publisher

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B.F.Goodrich

CONCRETE 38
READY-MIXED CORP.

Universal tires average 40,000 miles in concrete delivery service

THE Concrete Ready Mixed Corp. delivers concrete to construction sites around Roanoke, Va. The trucks work 60 hours a week hauling gross loads of 20 tons over all types of roads, often over no roads at all.

READY-MIXED CORP.

CONCRETE READY MIXED CORP. reports they save 60% by being able to recap B. F. Goodrich Universal tires. They say the specially-compounded Universal tread gives so much traction, they never need chains.

For rugged service like this, the company specifies B. F. Goodrich Universal tires, reports they defy rock cuts and bruises, roll 40,000 miles and can be recapped!

All-Nylon cord body

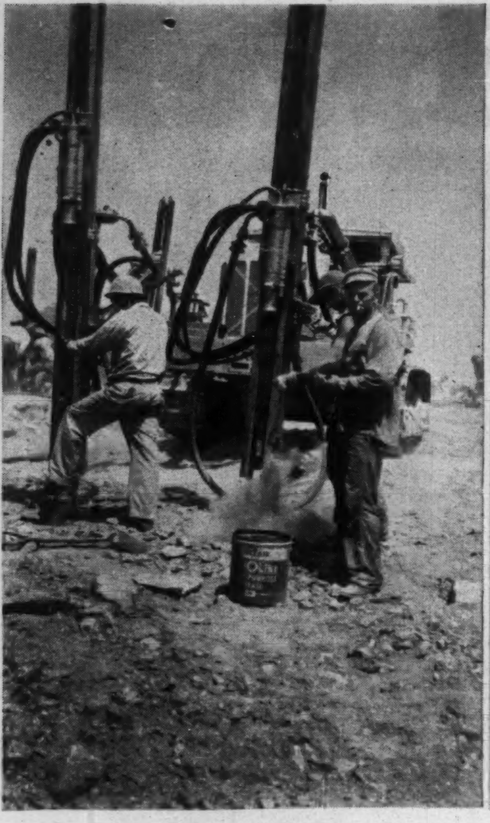
Universal tires wear longer because they are built with an all-nylon cord body (sizes 12.00 and larger). Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks.

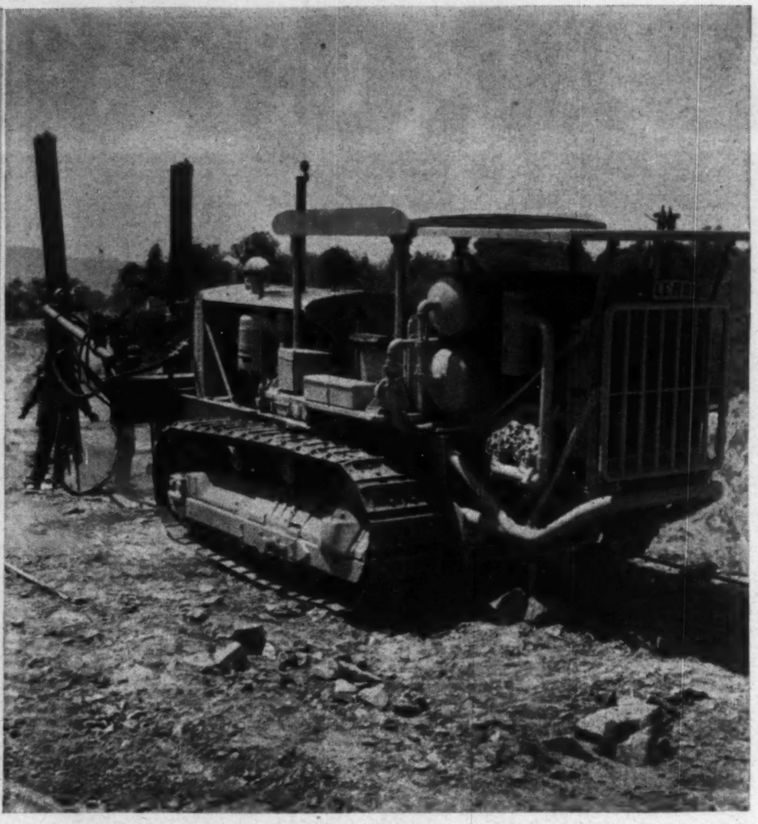
Under the tread is the B. F. Goodrich nylon shock shield. Layers of strong nylon cords stretch together to absorb and distribute impacts and shocks. Result: Universal tires wear longer, can be recapped more times. You pay nothing extra for this patented B. F. Goodrich nylon shock shield.

See all-nylon Universal tires at your B. F. Goodrich retailer's (smaller sizes in all-nylon or rayon construction). They'll cut your tire costs by giving you longer, trouble-free service. For the BFG address, look under Tires in the Yellow Pages of your phone book, or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, O.*

Specify B. F. Goodrich tires when ordering new equipment.

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER





Making Time on the N.Y. Thruway!

Le Roi 600 cfm compressor and Cleveland T-286 drill rig speed drilling operation

Motorists aren't the only ones who travel fast on the N. Y. Thruway. Contractors had to make plenty of time, too.

That's why this contractor made a mobile drilling unit out of his D-8 Cat. He used as components a Le Roi 600 CTM compressor and the Cleveland T-286 drill rig.

The compressor is designed especially for use with D-8 or TD-24 tractors. It is the only unit that attaches directly to the PTO and has a clutch as well. Capacity of the unit is 600 cfm.

The T-286 drill rig consists of two Cleveland patented air feeds, and Cleveland 4" drifters with air-motor booms. Here, it is mounted on the front of the tractor and has a spread of 220 degrees suitable for any variable drill pattern. Ten-foot steel changes, faster set-ups, better hole spacing, greater footage, better fragmentation—mean faster drilling and lower costs.

If you want to make time and cut costs on your rock jobs — just put an old tractor to work this way. Write us for literature that tells how.

LE ROI *Division of Westinghouse Air Brake Co.*
Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS • TRACTAIR • STATIONARY AIR COMPRESSORS • ENGINES • AIR TOOLS • TRUCK MIXERS • FRONT-END LOADERS

C-159

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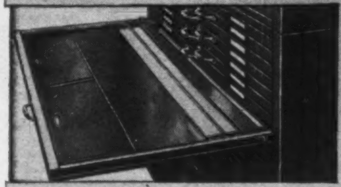
Keep more tracings safer... handier

in Hamilton Shallow Drawer Units

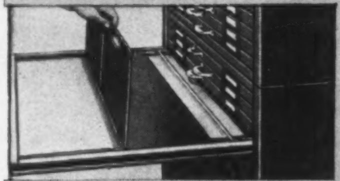
There's so much less wear and tear—and *no loss*—when your tracings are kept smooth and flat in Hamilton's popular Shallow Drawer Unit. This 10-drawer unit, only 15⅜″ high, holds up to 1,000 drawings safe within its rugged walls of heavy spot-welded steel—yet lets you find any *one* of them instantly!

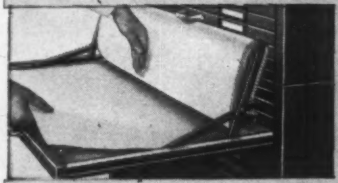
Hamilton builds outstanding units for every tracing storage need, many units interlocking into one installation—*all* of them likely to save you much money in irreplaceable work and time. Why not contact your Hamilton dealer soon?



KEEPS THEM FLAT

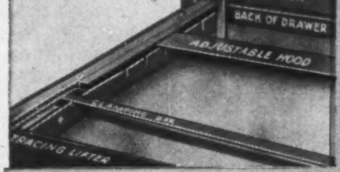
Each drawer equipped with exclusive Tracing Lifter, which also acts as compressor to hold sheets down flat—preventing crumpling, curling, or tearing.





INSTANT SELECTION

Front half of Tracing Lifter raises to let sheets be folded over and back, until desired drawing is found and easily slipped out, other sheets remaining in place.

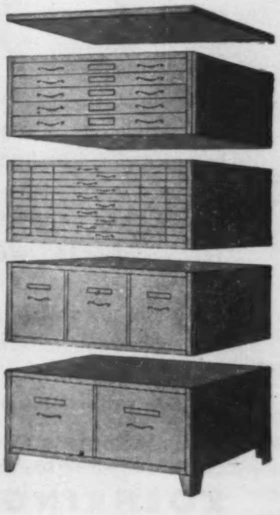


FITS MANY SIZES

Conforming to various tracing sizes, adjustable rear hood slides over slotted drawer sides to required depth. Swing bar drops to secure hood—keep sheets from creeping over back of drawer.

SAVES FLOOR SPACE

Many Hamilton Units (Shallow Drawer, 5-Drawer, Vertical Units) interlock into single, compact UnitSystem to build storage facilities *upward.* Interlocking caps and bases available.



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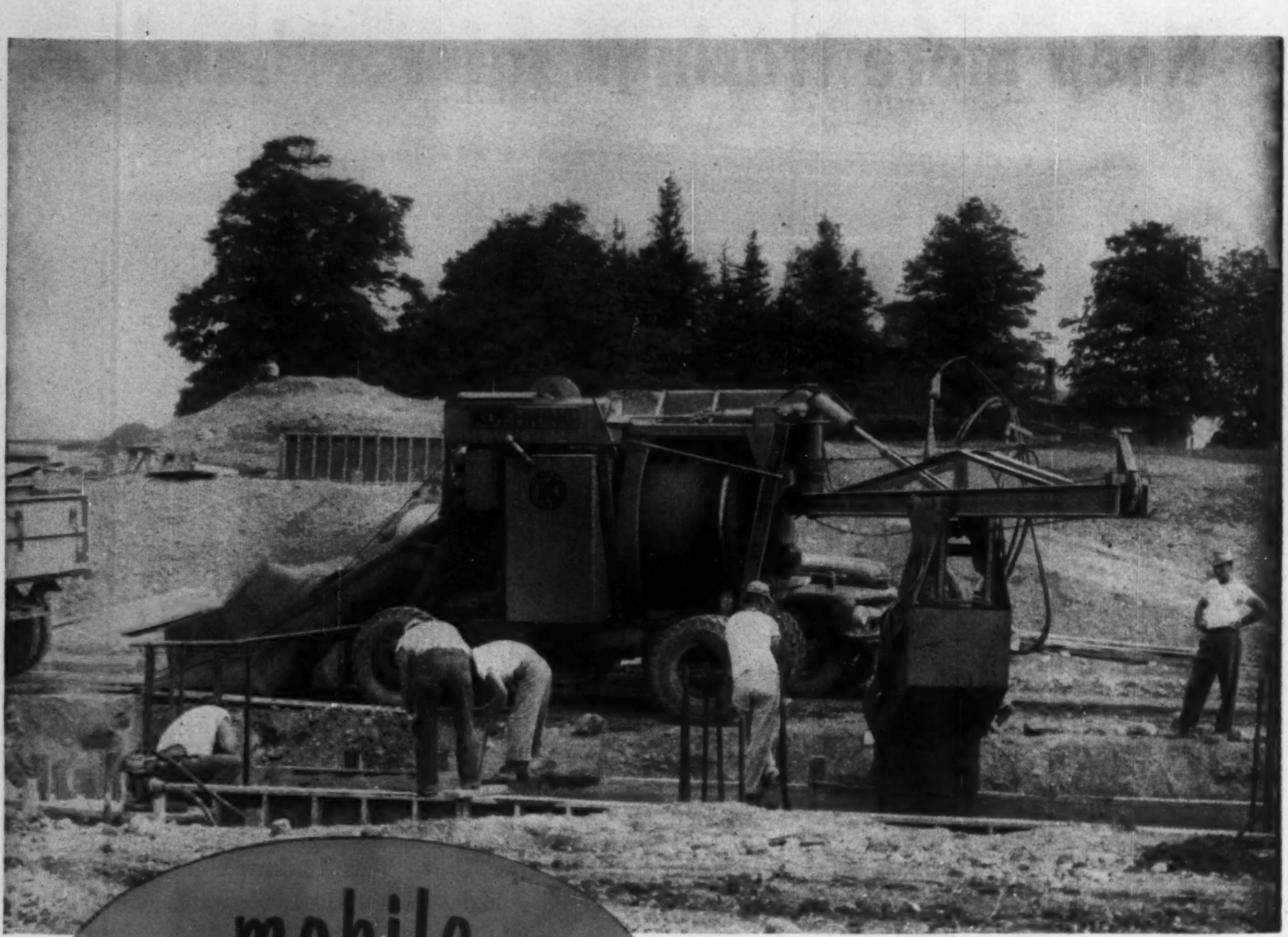
Hamilton

MANUFACTURING COMPANY

Two Rivers, Wisconsin



mobile concrete mix plant on rubber

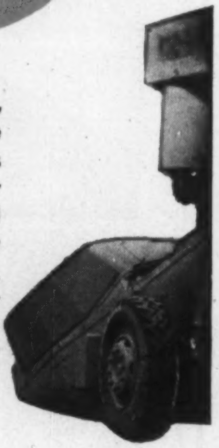
Koehring 16-E *twinbatch* rides on pneumatic tires . . . works, travels on or off pavement . . . makes self-powered moves at 9 m.p.h. Its rubber-tired mobility increases productive work-time. Its high elevating boom discharges into overhead hoppers . . . pours concrete for buildings, pilings, culverts . . . or batches into trucks. Bucket on 60° elevating boom discharges at a height of 21 feet (higher with special boom). Boom also swings in a 160° arc . . . speeds pouring of floors, footings, highway and airport strips.

This versatile 16-E easily mixes and distributes over 50 cu. yds. per hour. 7-second skip hoist, split-second Autocycle mixing, and vertical syphon-type water tank all assure consistent, maximum-strength concrete at top mixing speeds. Get all the facts from your Koehring distributor . . . or write *Koehring Co., Milwaukee 16, Wis.*

(Subsidiaries: JOHNSON • PARSONS • KWIK-MIX)

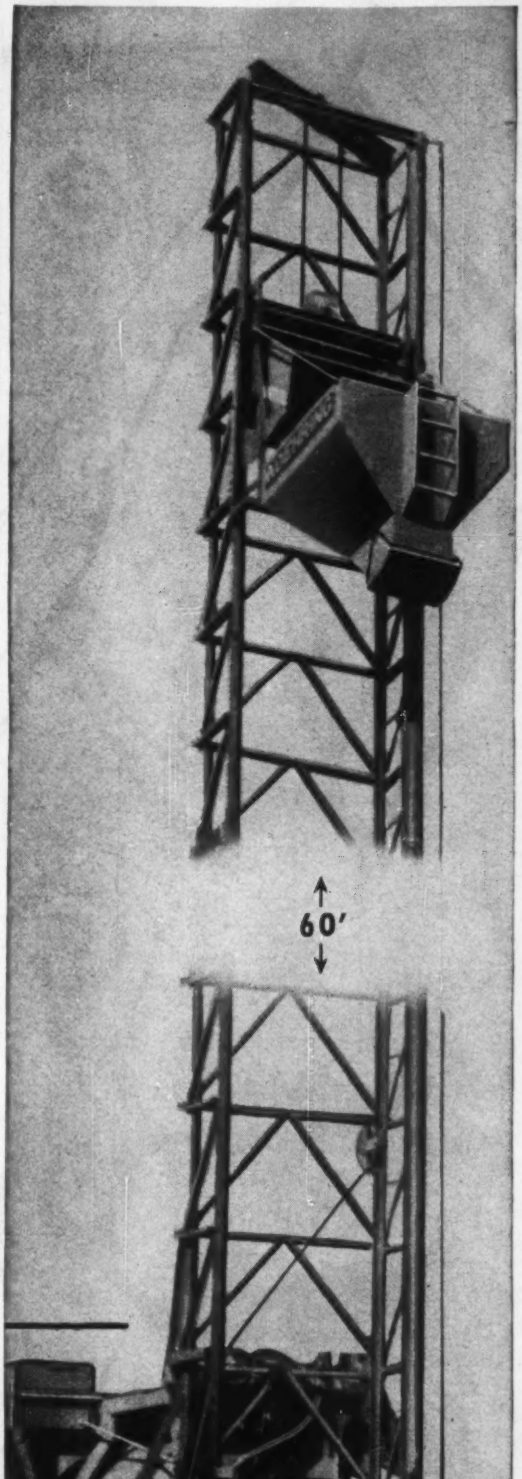
KOEHRING 16-E *twinbatch*®

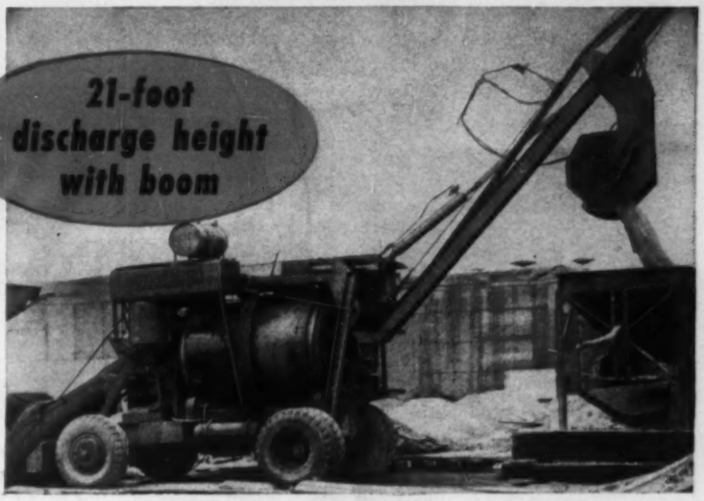
48½-foot discharge height with tower



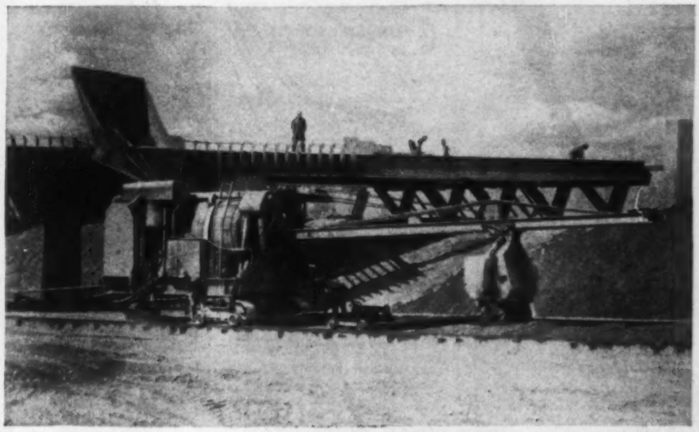
On the Koehring 16-E, the elevating boom is interchangeable with a 40 or 60-foot tower. This gives discharge heights up to 48½ feet for pouring high columns, piers, decks and upper floors. 21½-cu. ft. hoist bucket discharges automatically into 40 cu. ft. overhead hopper. Hopper is easily positioned (at 6-inch intervals) anywhere along face of tower. Tower is raised . . . or safely lowered into horizontal carrying position . . . by the same hydraulic ram used on the elevating boom.

K436

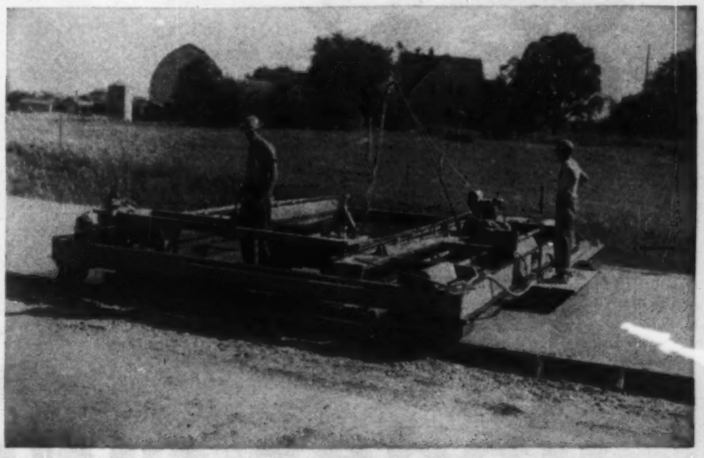




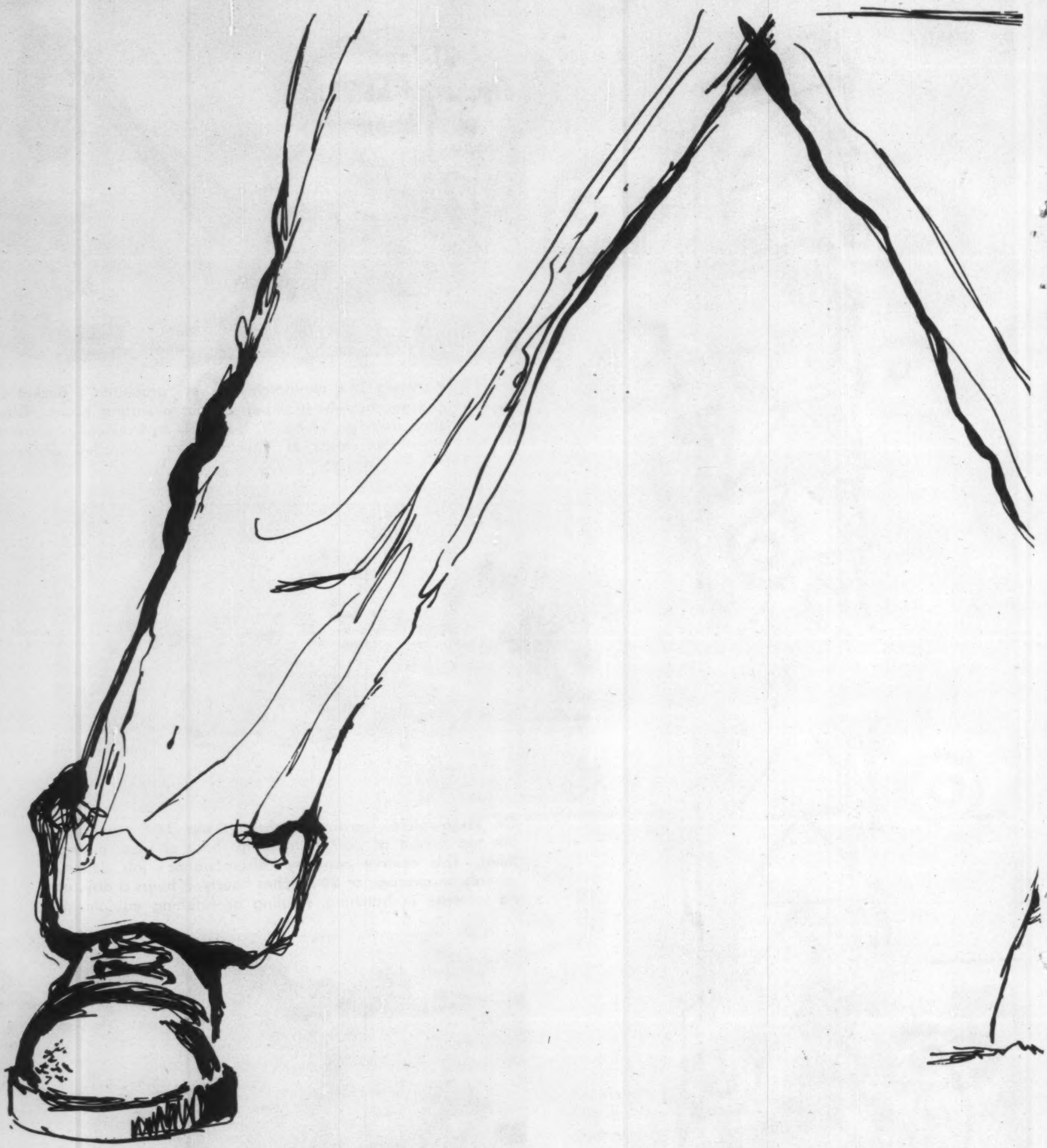
Koehring 16-E *twinbatch* is never "grounded". Bucket discharges anywhere along 25-foot elevating boom. Clamshell door on 24-cu. ft. bucket is hydraulically operated, opens or closes at any time for controlled discharge.



On large-volume paving, Koehring's big 34-E *twinbatch* hits top output of 86.7 batches an hour (60-sec. mixing time). This reserve capacity offsets normal job delays, assures an average of 50 batches hourly, 8 hours a day, at no increase in batching, hauling or finishing equipment.



"Timely", precision-finishing is important on any paving job. Koehring Longitudinal Finisher operates at almost twice the speed of a 34-E paver, produces mechanically-accurate concrete slabs, 8-to-30-ft. wide, uniform crown transitions.



under construction.

dams

FOLSOM, CALIFORNIA
NEWHALEM, WASHINGTON
STAMFORD, CONNECTICUT

industrial plants

CHEMICAL FERTILIZER PLANT—JOPLIN, MISSOURI
NEWSPRINT & PULP MILLS—KAWERAU, NEW ZEALAND
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METAL BONDING PLANT—EAST ALTON, ILLINOIS
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POWERHOUSE SUBSTRUCTURE—ASHLAND CITY, TENNESSEE

aviation fuel storage depot

MELVILLE, RHODE ISLAND

docks & piers

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PEORIA, ILLINOIS
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vehicular tunnel

HAMPTON ROADS, VIRGINIA

marine oil terminal facilities

KURNELL, AUSTRALIA
BOMBAY, INDIA

air bases

GOOSE BAY, LABRADOR
CRETE, GREECE

bridges

MACKINAC STRAITS—ST. IGNACE, MICHIGAN
HUDSON RIVER—TARRYTOWN, NEW YORK
DELAWARE RIVER—EDGELY, PENNSYLVANIA
CUYAHOGA RIVER—CLEVELAND, OHIO
ILLINOIS RIVER—PEORIA, ILLINOIS

signal corps depot

TOBYHANNA, PENNSYLVANIA

The above partial list of current projects reflects the versatility, in all fields of construction, which enables Merritt-Chapman & Scott to say, "YOU NAME IT, WE BUILD IT!"

MERRITT-CHAPMAN & SCOTT
CORPORATION
Founded in 1860
260 Madison Avenue • New York 16, N. Y.

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THE OSGOOD CO.
Marion, Ohio
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Power Shovels
from ½ to 60 cu. yds.
Truck Cranes
from 15 to 25 tons
Mobilcranes
from 25 to 45 tons
Log Loaders

FITZ SIMONS & CONNELL DREDGE & DOCK CO.
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Galvanized Sheets
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Colorbond Sheets
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Electric Weld Line Pipe
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of all sizes
Carbon & Alloy Steel Bars
Bar Size Shapes

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Huntington, Indiana
TV & Radio Cabinets
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Your Confidence Is Justified Where This Flag Flies

FLEXTRIP WATERSTOP

THE LATEST

VINYL PLASTIC WATERSTOP

for "wall-floor" and "between-pour" horizontal concrete construction joints

Water just can't get through joints protected by FLEXTRIP, the all-new, strip-type waterstop. Unique concave shape plus ribbed edges give FLEXTRIP a never ending grip in the concrete . . . is flexible enough to withstand extreme joint-separation (more than 3 inches) yet rigid enough to stand up to the battering effect of pouring concrete. Here's lasting joint-protection unmatched by any other waterstop. What's more, FLEXTRIP will never rust, rot, check or crack and is unaffected by acid, alkalies, petroleum products, chemicals or the most adverse atmospheric conditions . . . lasts as long as the concrete. Write for additional information on FLEXTRIP and other vinyl waterstops. Send coupon below.

Made by the makers of LABYRINTH WATERSTOPS . . . the standard waterseal on outstanding construction jobs everywhere — eliminates seepage problems . . . simplifies form work.

WATER SEALS, INC.
9 South Clinton • Dept. 4, Chicago 6, Illinois

Without obligation, please send me information on your new FLEXTRIP and LABYRINTH WATERSTOPS.

Name____________________
Company____________________
Address____________________
City__________ Zone____ State____

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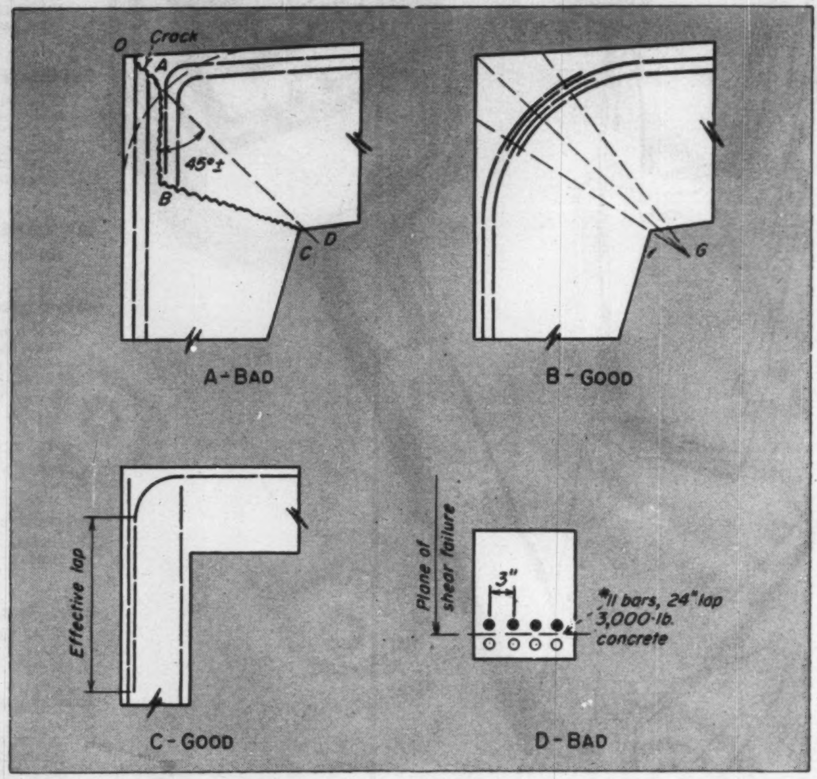

Good and Bad Bar Splices

SIR: This concerns the article published in ENR Nov. 11, 1954, p. 36, regarding the failure of a concrete rigid frame, and the subsequent reader comment, which I have followed with interest:

In particular, Alfred Zweig, in his letter (ENR Dec. 30, 1954, p. 8), blames the failure on the ACI code. Even though the minimum lap used, were it properly detailed, would have produced a joint with but little safety factor, the misuse of the lap did produce a failure in plain tension for which the ACI code cannot be blamed.

To clear up this point without resort to analogies, let us compare two details as shown in sketch A and B. Sketch A shows the bars as originally placed and B shows the proper arrangement for the splice with the same lap.

With reference to Sketch A, it can readily be demonstrated that the dead-load moment on section OD (the plane of bending) is of sufficient magnitude to exceed the ultimate unit tensile stress of plain concrete at point O. Hence, the crack from O to A. Because of the hooked bars at A, the crack to continue must be vertical and toward B. Plane AB makes an angle of approximately 45 deg with the flexural section OAD, and so from elementary mechanics, there exists at point A and perpendicular to plane AB, a shear stress and a tensile stress of equal magnitude—both half the value of the pure tension existing at point A and perpendicular to AD. Again, it can readily be demonstrated that the extreme fiber stress at point A is of such magnitude that one-half its value will cause rupture on plane AB. After the crack reaches B, there is no hope for the section; rupture continues from B to C on the normal flexural cross section.

Now let us examine Sketch B. Several sections through point G have been drawn. Note that at each intersection of bars with the sections of simple bending, the bars are at right angles to these planes. As a result, any plane parallel to the bars will not have a component of tension and failure can result only by shear or bond failure.

In ordinary framing say where a beam is framed to a spandrel column, as shown in Sketch C, the major part of the lap of the negative steel is automatically in the column and parallel to the fiber stress. Since the lap is

(*Reader Comment cont. on p. 14*)

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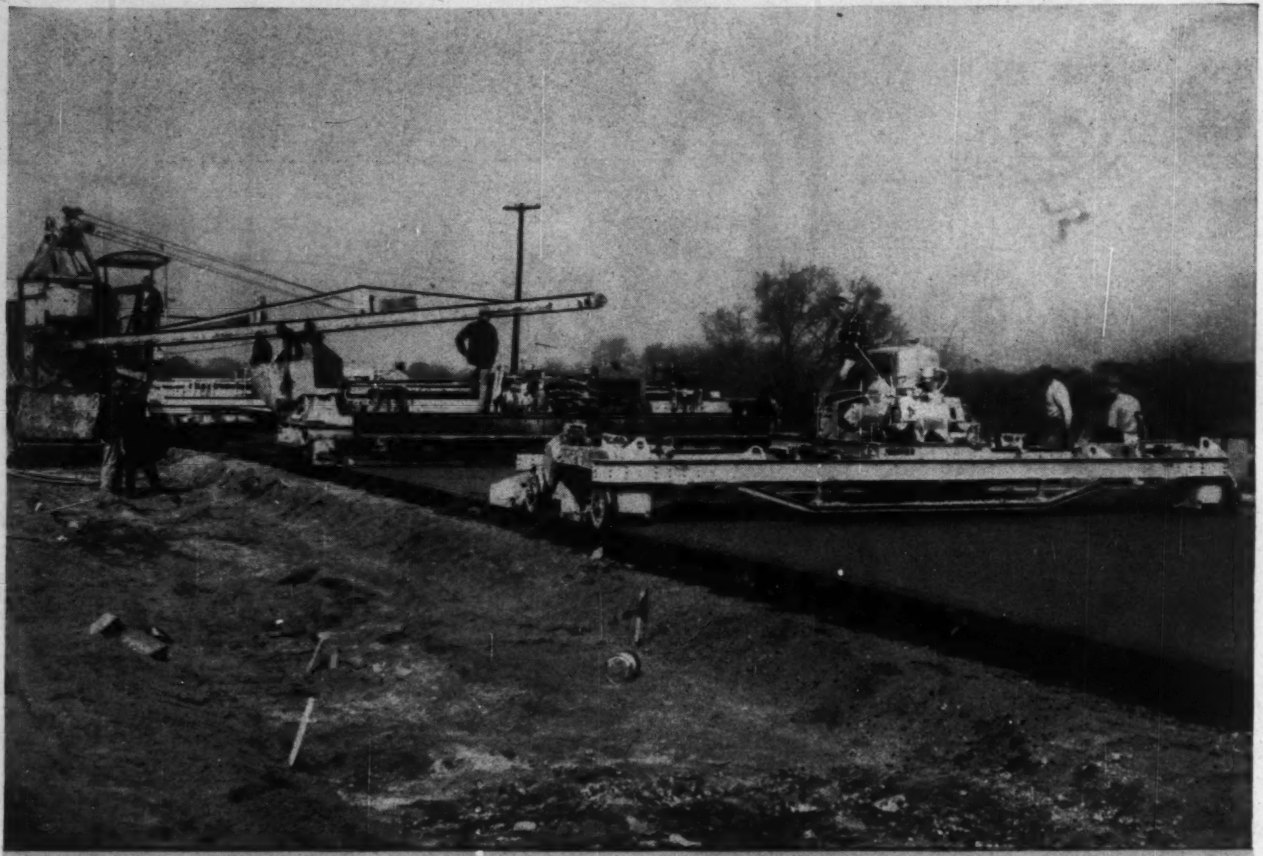

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not made in the haunch, where the direction of the fiber stress is changing, there is no problem. But where members are large compared to bar sizes and laps, special precautions must be taken to prevent the condition shown in Sketch A.

I do agree with Zweig that in many instances ACI allowable bond stresses are too high. These higher stresses were permitted on the basis of pull-out tests of one bar in a mass of concrete of such size that splitting of the concrete was largely eliminated. Likewise, shear in the concrete was not a factor. Too much attention was given to the high-bond bar and not enough to the concrete that contains it. It is true that flexural tests were also made of lapped bar splices, but again, only one bar out of three was lapped (the other two were continuous); so splitting and shear were not factors.

An example of a dangerous tension lap is shown in the flexural section in Sketch D. Note that the shear section per bar is only 3x24 in., or 72 sq. in. and that at 20,000 psi the force to be transferred is 31 kips, with a resultant shear stress of 430 psi. Note that this splice meets the ACI code requirement.

Until such time that the ACI makes specific recommendations, the conservative designer will use longer laps for tension splices. He will also check shearing stresses and provide hoops along the lap to prevent splitting.

NORMAN E. SCHLENKER
Consulting Engineer
Gill, Beane & Schlenker
Buffalo, N. Y.

Check Shear at Bar Splices

SIR: In previous comments on the failure of a reinforced concrete bent, reported in ENR Nov. 11, 1954, p. 36, it has been suggested that the failure was caused by the existence of a plane of rupture without any reinforcing, or by bond failure.

In any typical lap splice, including the one at the base of a cantilever retaining wall, it would be possible to conceive a similar plane of rupture between the overlapping ends of the bars. The stress in such a section, however, is shear, not tension (except a small amount caused by the offset between the bars). Assuming 20,000 psi in the steel, the total stress in the two layers of No. 11 bent bars would be 8 × .56 × 20,000 = 250,000 lb, and the average shear in the concrete between these bars and the ends of the column bars

(*Reader Comment cont. on p.* 18)

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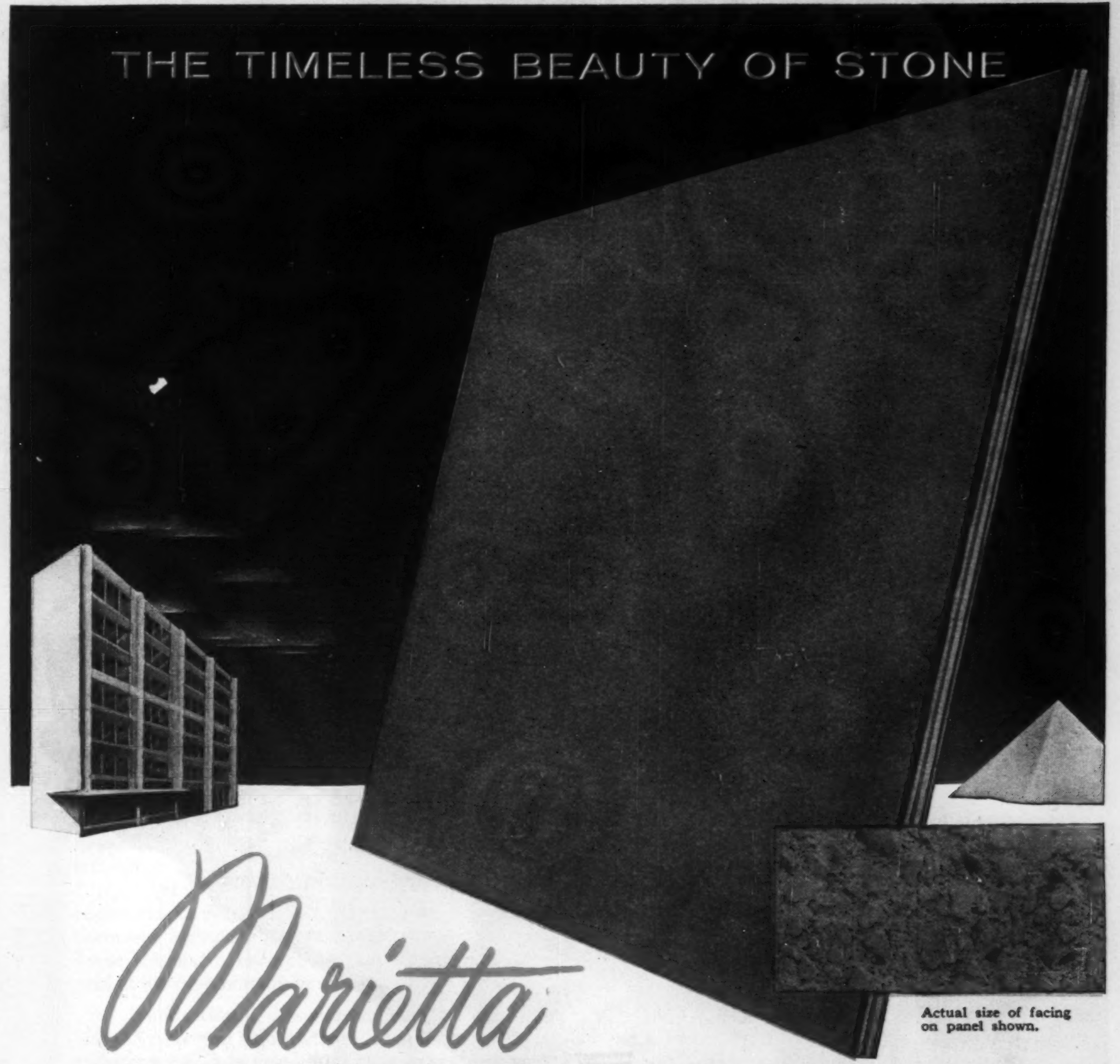

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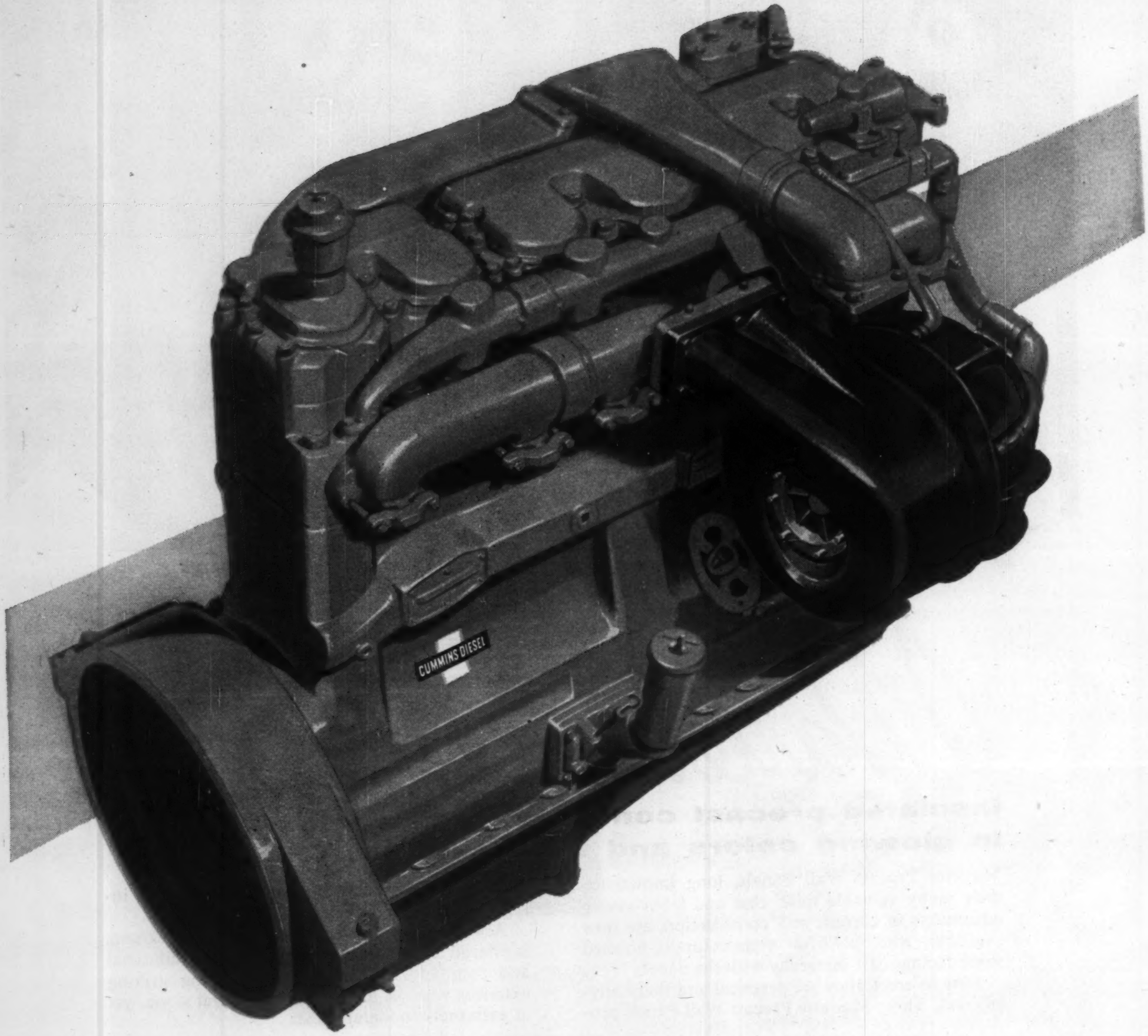
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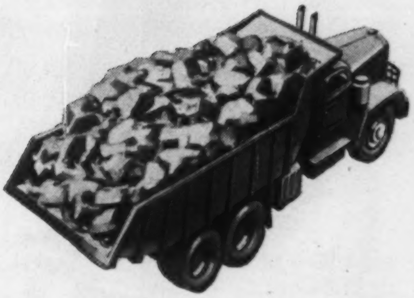

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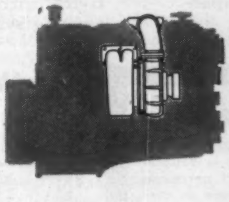

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The picture on p. 38 of ENR Nov. 11 does not show any bars exposed as they would be by bond failure. The line of rupture rather indicates a shear or diagonal-tension failure. The influence of tensile stresses is clearly noticeable at the top corner, but it would seem that the high shearing stress was a major cause of the failure.

This failure points to the necessity of investigating possible planes of shear at bar splices. In this connection, the question arises as to the allowable stress for the shear, which could probably be higher than the usual design stresses for shear in beams involving diagonal tension.

V. B. W. Poulsen
Civil Engineer
Richmond, Va.

Light Shed on Bent Failure

Sir: The letter by Alfred Zweig in ENR Dec. 30, 1954, p. 8, poses several questions regarding the concrete-bent failure reported in ENR Nov. 11, 1954, p. 36. Since I have been much closer to the scene, I believe that some of the questions may be simple to clarify, if not answer.

It apparently was the intent of the designers of the bent to intermesh the beam corner bars and vertical column bars in two layers with a side-by-side lap splice of 2 ft 6 in. But the drawings were somewhere interpreted in such a manner that a horizontal distance of almost 5 in. was left between the outer, downstanding legs of the beam corner bars and the inner column verticals. This resulted in the "entirely unreinforced" plane of failure pictured in ENR No. 11, p. 38.

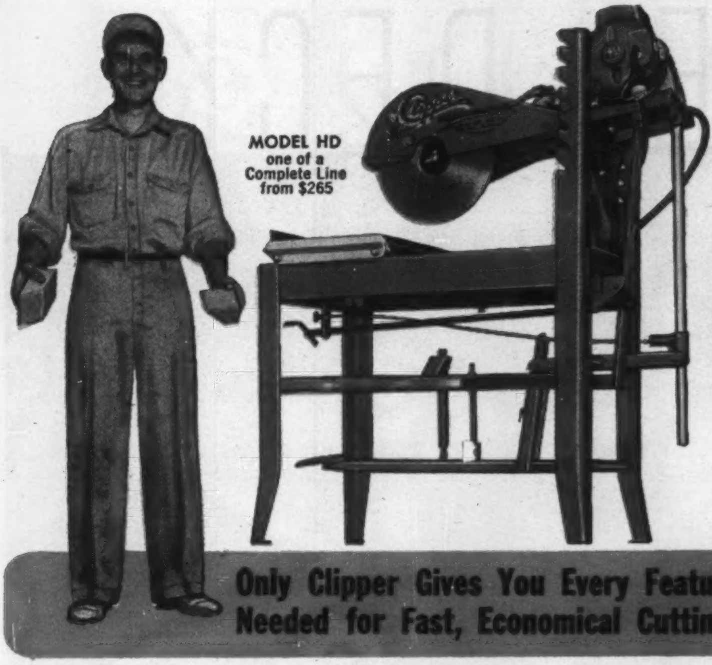
Most engineers probably agree that the designer's intent would have resulted in a frame joint with a satisfactory factor of safety for usual design loads and elastic analysis. Likely, also, all engineers are in agreement that there is a definite need for more research on the matter of transferring stress by "bond" around a standard 90-deg bend of a reinforcing bar highly stressed in tension.

Norman B. Jones
Structural Engineer
Whittier, Calif.

Another Use for Models

Sir: Your January 6th issue, p. 41, contains a most interesting resume of the various uses to which small-scale engineering models are being put in design of different types of plants.

(Reader Comment cont. on p. 25)



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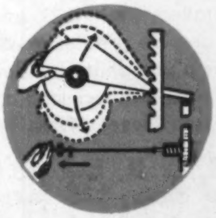

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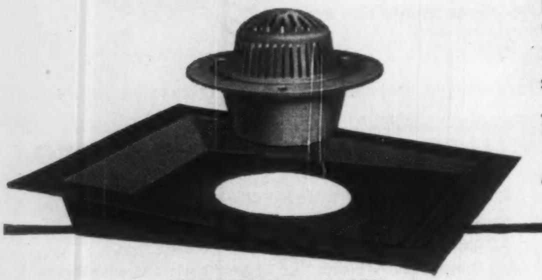

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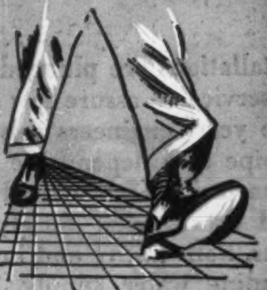

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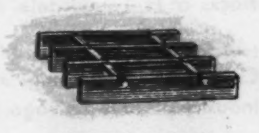

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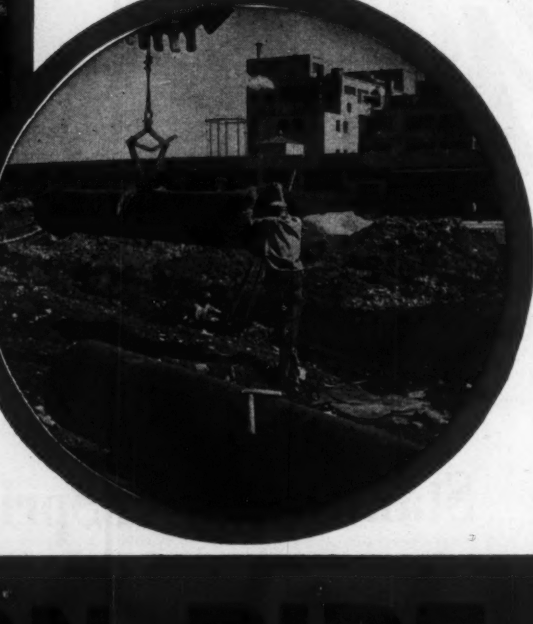

(above)
Laying 16-inch cast iron pipe alongside railroad tracks at Ft. Lauderdale, Florida.

(at right)
Cast iron pipe being installed for large process industry plant in Chicago.

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(above)
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(at left)
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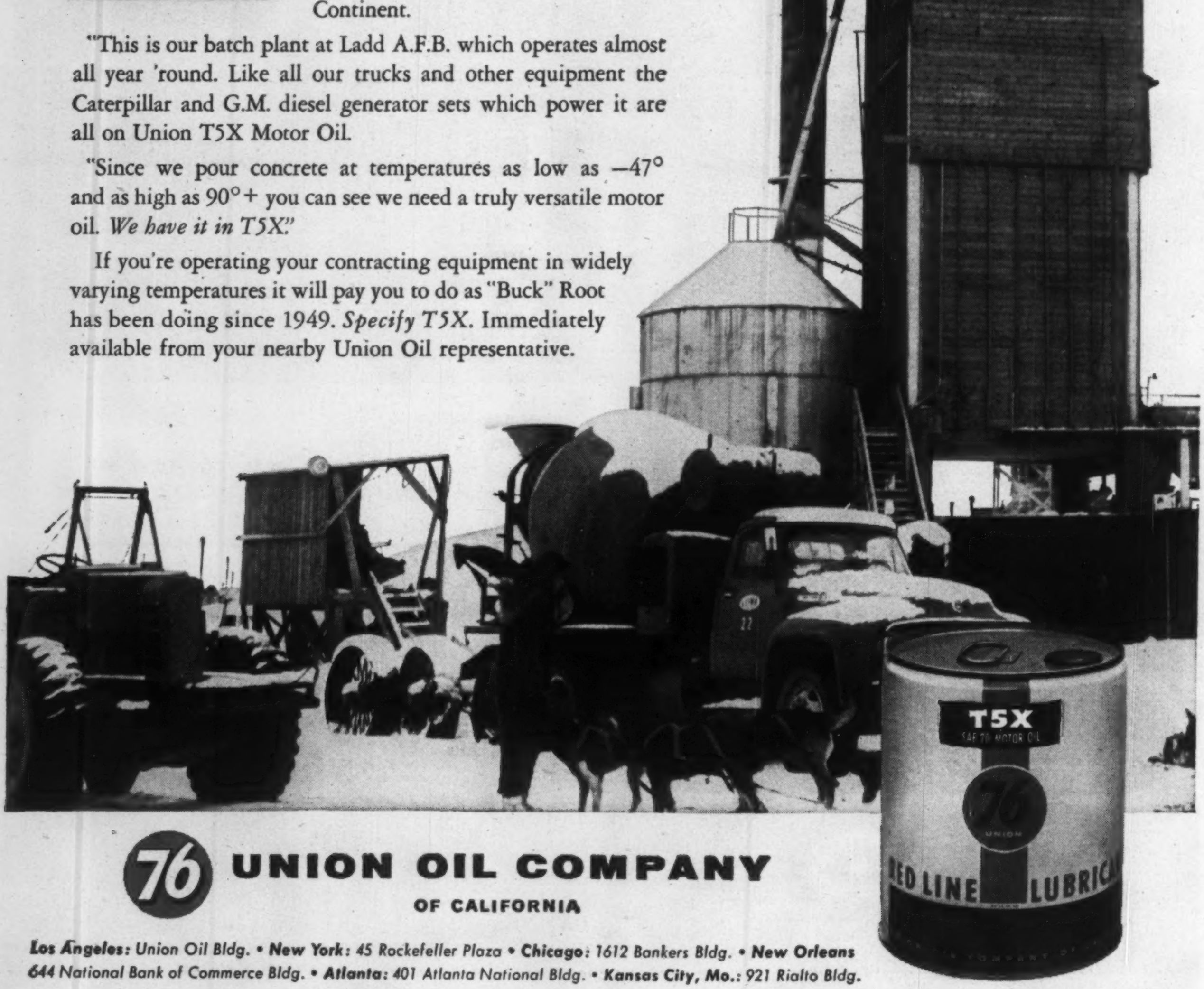

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This further use of models, not mentioned in the article, may possibly be of interest to engineering departments of other manufacturing companies operating branch plants overseas.

Lord Pentland
Director
American British Electric Corp.
New York, N. Y.

Don't Change the ACI Code

Sir: I hasten to take issue with Mr. Zweig both in his hypothesis and his conclusions (ENR Dec. 30, 1954, p. 8) regarding the rigid-frame failure (ENR Nov. 11, 1954, p. 36). The suggestion that the ACI Code be tampered with on the slender evidence afforded by these or any other uncontrolled field results is a breach of scientific method.

On the other hand, no effort should be spared to explain the failure satisfactory so that errors in application and resultant failures don't lead to penalties through code restrictions. The profession should not shrink from its economic responsibility.

As for the cause of this particular failure, it seems to me that the error lay in placing the splice at a point of radical change in direction of stress and placing the bars in such a way that a peeling action could take place, which actually put tension in the unreinforced plane. In my view, there is no question of bond stress.

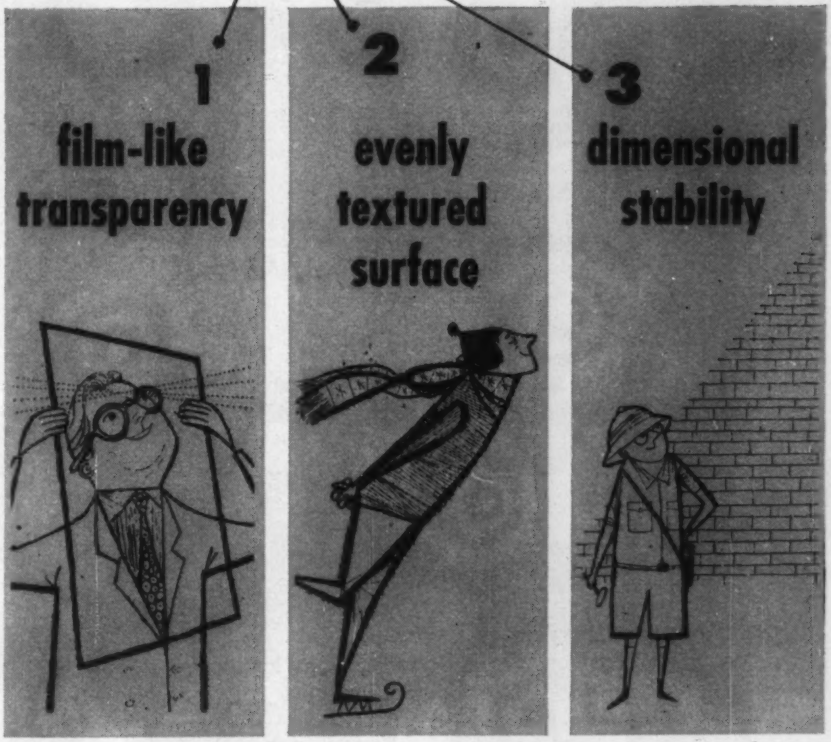
Harry Weese
Architect-engineer
Chicago, Ill.

Engineers in Government

Sir: I was very much interested in the editorial comment on the last page of your December 23, 1954 issue, titled "Engineers in Politics". This subject has had a very strong appeal to me ever since the days of Technocracy, which Manchester Boddy tried so diligently to promote several years ago. In my estimation, there is a technical factual foundation to all of our present day problems which could be solved by having complete factual information shorn of all its "highfa-

(*Reader Comment cont. on p. 26*)

which tracing medium has all three?



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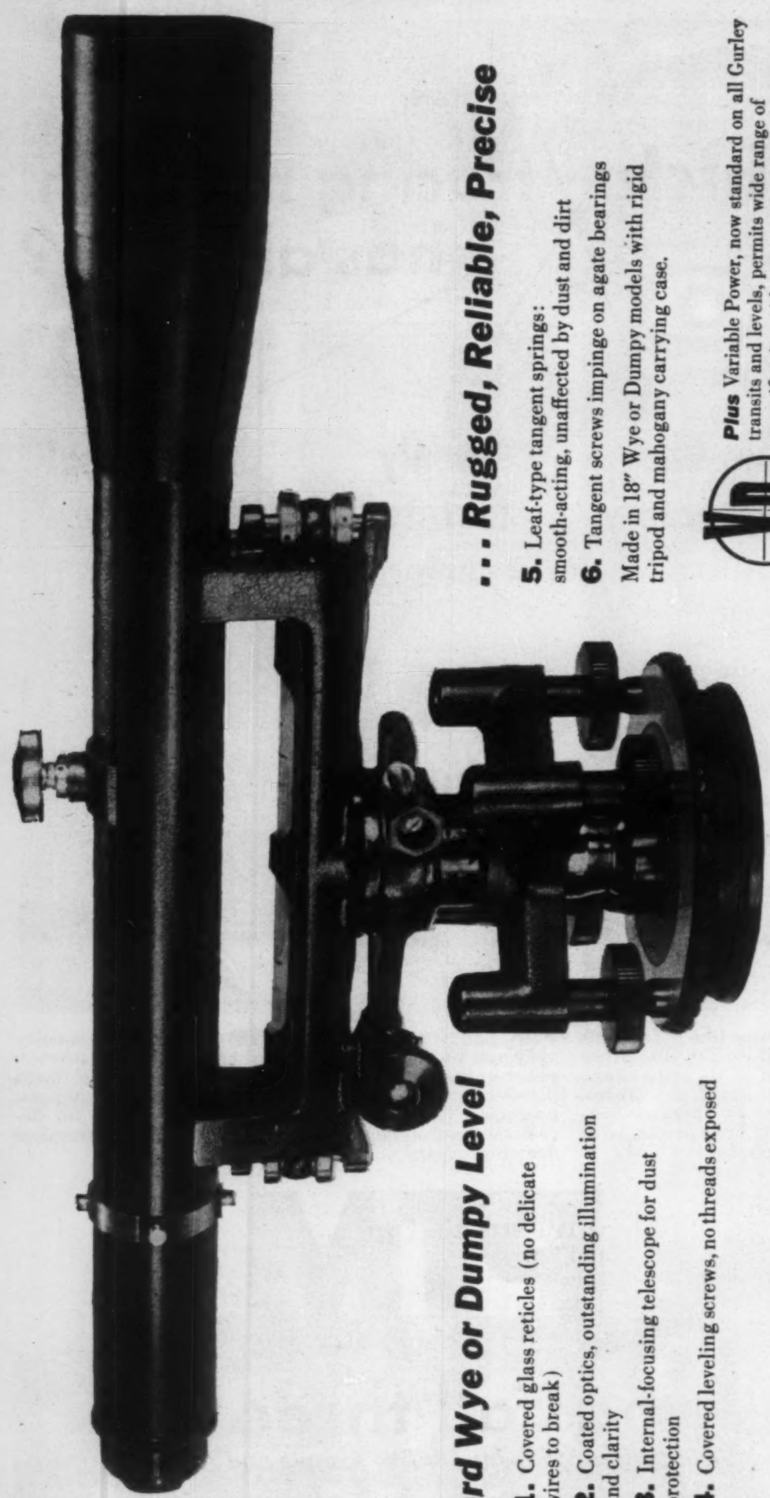

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lutin" verbage, which the legal minds seem to like to inject.

It is my candid opinion that we would have a much better government today in Federal, State, County and City if we were to adopt the principles of sound business administration backed up by sound engineering data. In order to get it, I believe we should make public speaking one of the prime requisites of any engineering course and it should be a top requirement in each semester of the entire engineering course.

I am sure many engineers as well as myself, have seen it happen time and again where a thoroughly competent engineer, thoroughly conversant with his subject, becomes flustered by some fast talking politician, usually an attorney, and loses out on a fine piece of construction work simply because he had not been taught the art of public speaking which would allow him to impart his knowledge to others. I felt that this article was extremely timely and does contain a tremendous amount of food for thought, and that we all should try to assimilate it.

All of this is appropos to getting good public speaking courses introduced as a MUST in all semesters of our engineering courses, so that we may get competent technically trained men in public life.

A. T. WINTERSGILL
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CALENDAR

Annual Highway Engineering Conference of the University of Colorado, Boulder, Feb. 24-25.

Concrete Contractor's Association of Greater Chicago, Mid-West Concrete Exposition, Navy Pier, Chicago, Feb. 24-26.

Association of Highway Officials of the North Atlantic States, annual convention, Hotel Traymore, Atlantic City, N. J., March 2-4.

American Society of Photogrammetry and American Congress on Surveying and Mapping, consecutive meetings, Shoreham Hotel, Washington, D. C., March 6-12.

National Association of Corrosion Engineers, annual conference, Palmer House, Chicago, March 7-11.

American Concrete Pipe Association, annual convention and meeting, Sheraton-Plaza Hotel, Boston, March 9-12.

Associated General Contractors, Roosevelt Hotel, New Orleans, La., March 14-17.

New York State Association of Highway Engineers, Hotel New Yorker, New York City, March 23-25.

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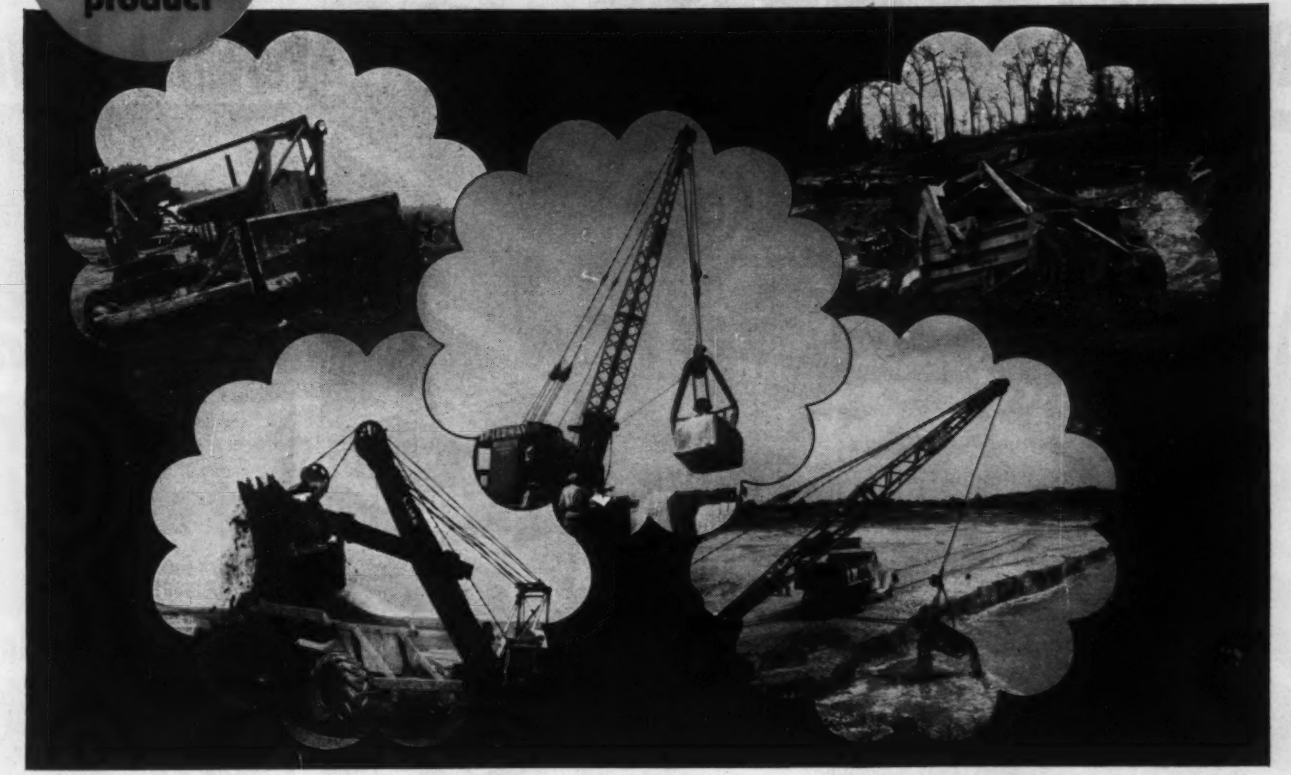

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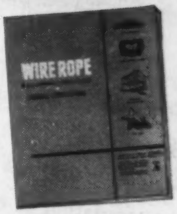

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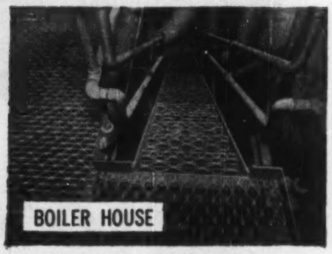

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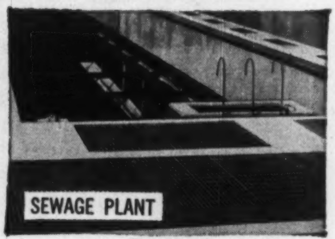

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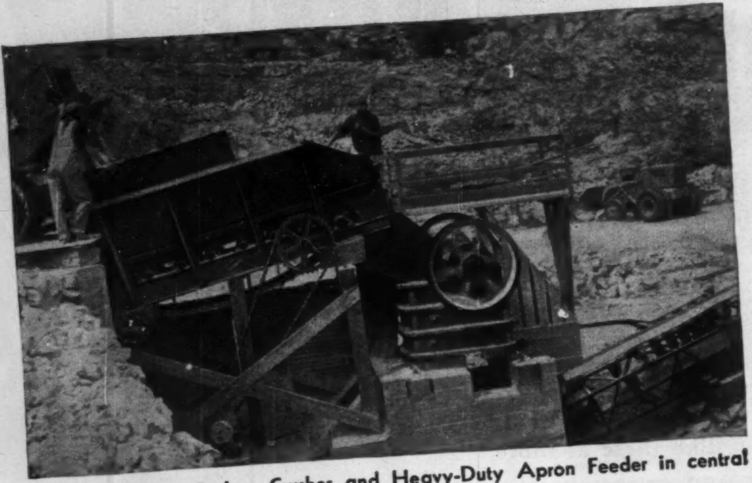
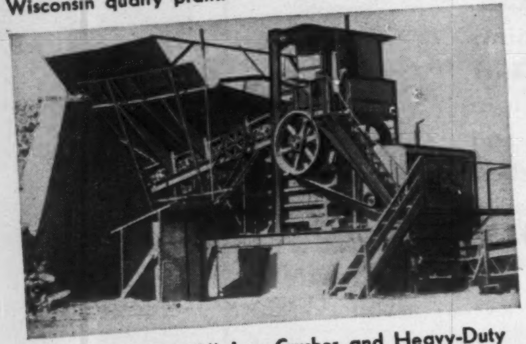

18" x 32" Telsmith Jaw Crusher and Heavy-Duty Apron Feeder in central Wisconsin quarry plant.

Telsmith 10" x 36" Jaw Crusher in an Oregon sand and gravel plant.


Telsmith 30" x 42" Jaw Crusher and Heavy-Duty Apron Feeder build airports in North Africa.

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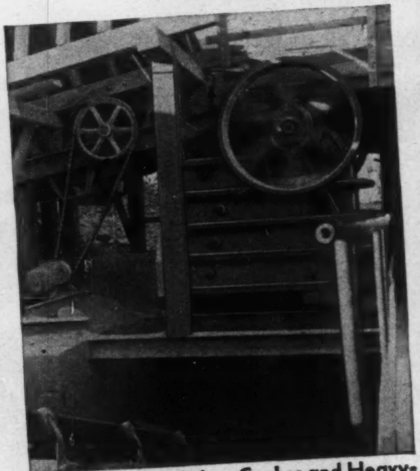
30" x 42" Telsmith Jaw Crusher and Heavy-Duty Apron Feeder in Pennsylvania quarry.

18" x 32" Telsmith Jaw Crusher, Heavy-Duty Plate Feeder and Rotary Grizzly in New York gravel plant.

J-1

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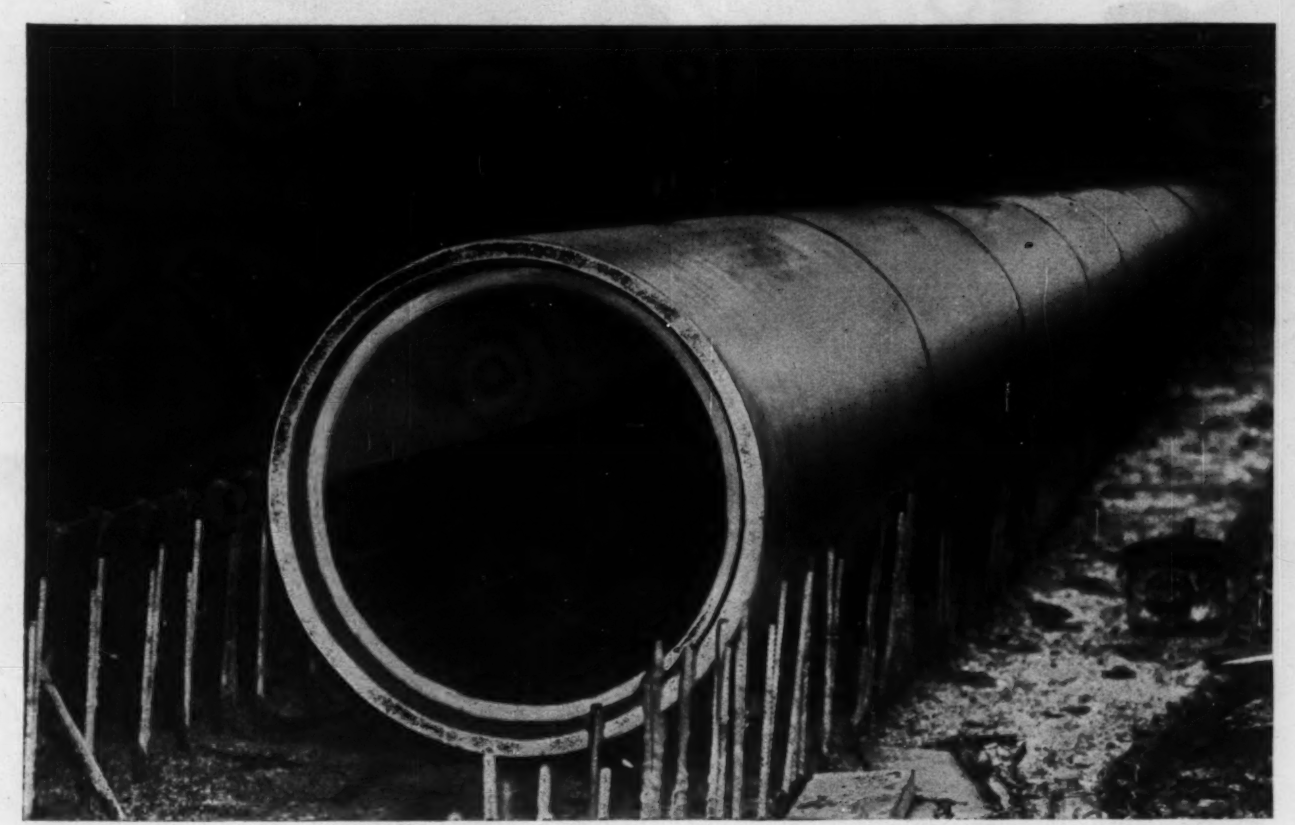

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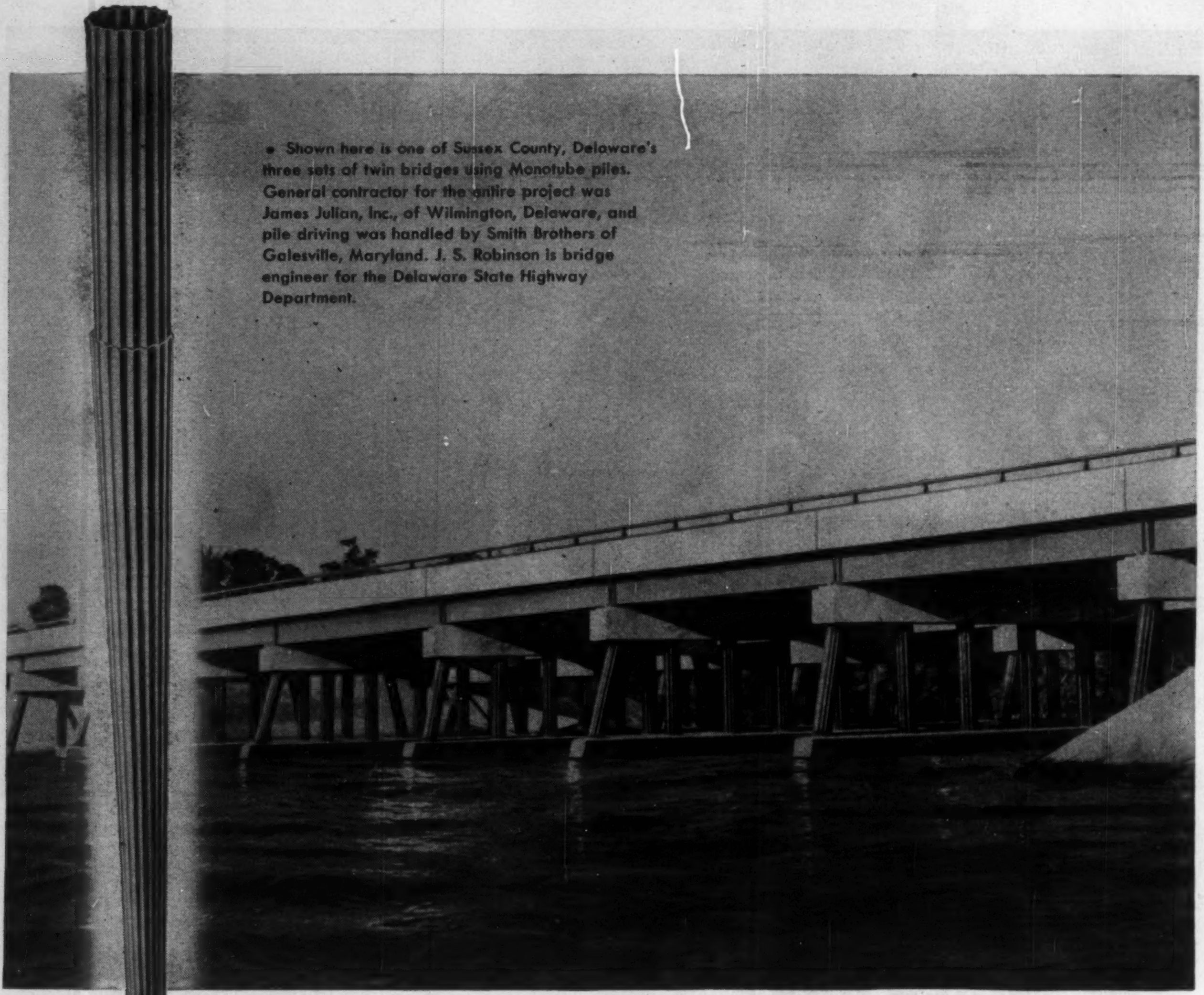

• Shown here is one of Sussex County, Delaware's three sets of twin bridges using Monotube piles. General contractor for the entire project was James Julian, Inc., of Wilmington, Delaware, and pile driving was handled by Smith Brothers of Galesville, Maryland. J. S. Robinson is bridge engineer for the Delaware State Highway Department.

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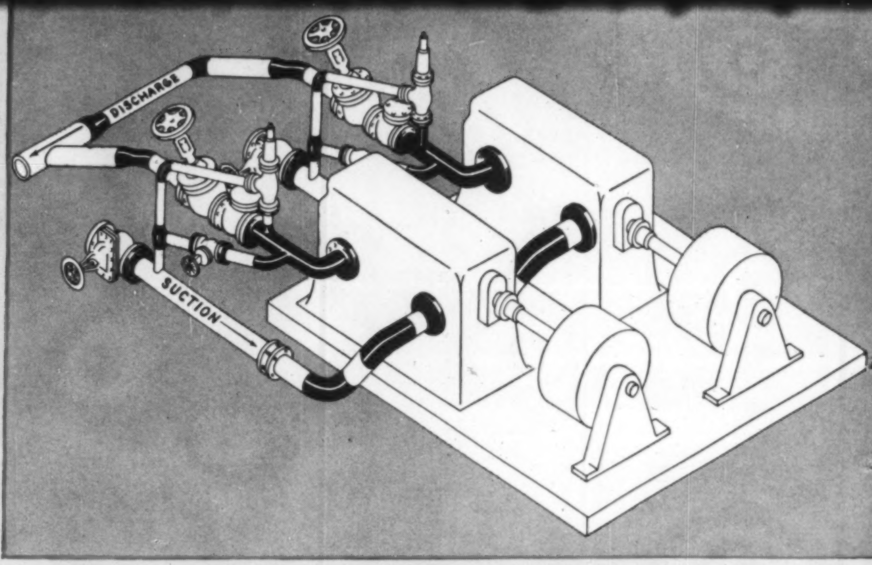

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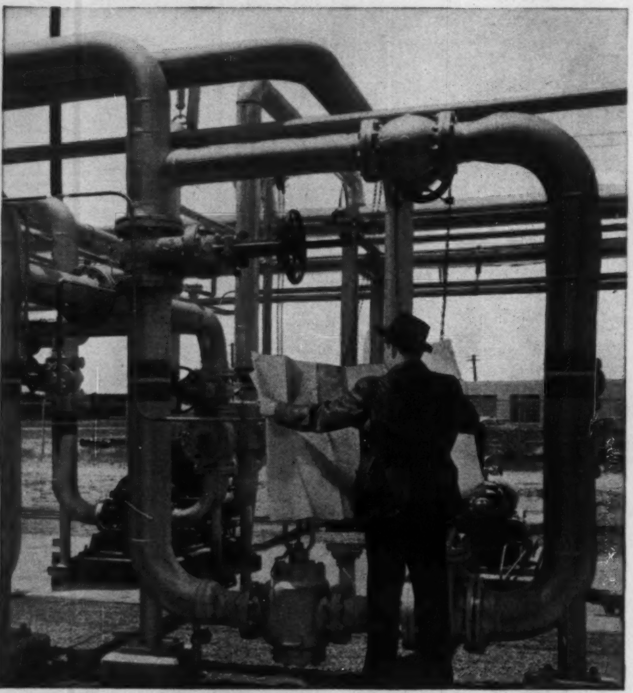

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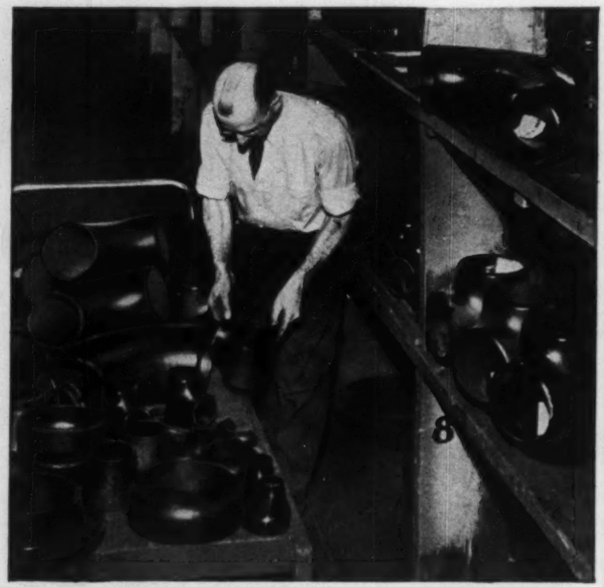

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

DON'T TOUCH!—Washington State's time-honored practice of taking immediate possession of land needed for highway construction isn't legal, says the state's highest court—and thereby may hang the fate of a $180-million toll highway (from Everett to Seattle).

Since 1925, the state has condemned land that it couldn't get by negotiation, appraised the property and paid the owner the highest valuation. If a court later awarded the owner more money, the state paid—but construction work went on without waiting for the outcome of court action.

That's not due process of law, according to the supreme court, and unless legislators correct this situation, the state can't continue the practice.

HELP WANTED—Ohio legislators—conscious of the pressure for action in clearing stream pollution—brought up a scheme to help smaller communities with their problems.

A bill introduced in the state senate would require the State Water Pollution Board to provide "such engineering and legal counsel" as may be necessary to communities with limited finances.

REPLACEMENT?—Political gossip at Columbus has it that Ohio State Highway Director Sam O. Linzell will step up to executive director of the Ohio Turnpike Commission sometime this summer.

TRY AGAIN—Despite setbacks that go back over more than five years, backers of that 103-mi belt conveyor between Pittsburgh and Lake Erie are making another try before the Ohio legislature.

Originally proposed in 1948, the two-way conveyor (to carry ore one way, coal the other) was to have cost $210 million. Its sponsors, Riverlake Belt Conveyor Lines Inc. (a collection of major Midwest companies), now estimate the cost would be $300 million.

Roadblock has been that, as a private corporation, Riverlake must have state permission for its right of way, and hasn't been able to get it. A bill clearing this obstacle is in the legislative hopper again.

WHAT'S IN A NAME—A bill to license and regulate electricians has been introduced in the Michigan legislature. The bill is entitled: "A bill to safeguard persons and property; to provide for licensing of electricians and electrical contractors; the inspection of electrical wiring; the adoption and enforcement of minimum standards therefor by an electrical administrative board; to exempt townships of less than 7,500 population according to the latest of each succeeding federal decennial census, excluding residents of incorporated cities and villages unless they elect to be covered by this act; and to prescribe penalties for violations of the provisions of this act."

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WASHINGTON OBSERVER

The school and highway programs are being scaled down, even before Congress gets seriously under way in considering the Administration's proposals. By the time Congress adjourns, both will look a lot different, and have fewer dollars in them than optimists have been promising.

•

Economy-minded Administration officials and Congress will balk at the expenditure of such sums as are envisioned to be added to highways—some $2.5 billion federal and a like amount from the states. And whether the President's program, or the Democratic program on schools is adopted as the way to speed up construction, the dollar figures are likely to be less than either proposes—nowhere near the $500 million a year that Sen. Lister Hill wants, or the $7 billion over three years the White House wants.

•

On highways: The Clay committee report has been under serious attack. Critics have delayed a Presidential message to Congress. It could come this week, but don't count on it.

Toll-road recommendations are just one point of dispute. Pressure is building up to put strings on "credits" returned to states for already-built and planned toll roads on the interstate system. Furthermore, user groups and travel service organizations are flatly opposed to making the trunk system less "free" than it is now.

Subsurface opposition is coming from the railroads. Their big fear is that extensive relocation of the interstate system would cost railroads hundreds of millions of dollars building new overpasses, underpasses, etc. Most states require the railroads to foot these bills.

The Administration has dangled before "economy" opponents an offer to cut the matching-fund program back to the $575-million level it was before the 1954 Highway Act was voted. Then the addition from the Clay program would be limited to the estimated revenue from the federal gasoline tax. There's no sign publicly that Sen. Harry Byrd, the chief economy man in Congress, has even bitten at this bait.

•

The school construction program the President advocates is one that can't possibly meet the goals that its advocates claim for it. Aside from politics, almost on the face of it, all the state-local-federal conditions required by the President's plan can't be satisfied so quickly as to result in the "doubling of school construction" during the next three years that Mrs. Hobby says is possible (see page 39).

Pressure from Republicans in Congress showed in the Administration's school program. Sen. Alexander Smith (R.-N. J.) is given credit for insisting that some sort of provision be made for grants to those states and school districts that are really too poor to pay for schools on their own.

•

The Dixon-Yates electric steam plant will be under construction by spring. Only waiting around now will be because of soggy ground conditions at the West Memphis, Ark., site. The Securities and Exchange Commission has approved the private companies' financing plans. And the Joint Atomic Energy Committee has voted a hands-off policy for the time being.

One hitch: Whether the public power groups in Congress refuse to give the Tennessee Valley Authority the money to buy the power at Memphis. A drive will be made, but there's doubt such a rider could get through.

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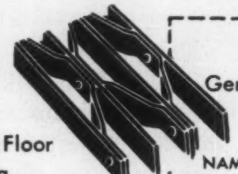

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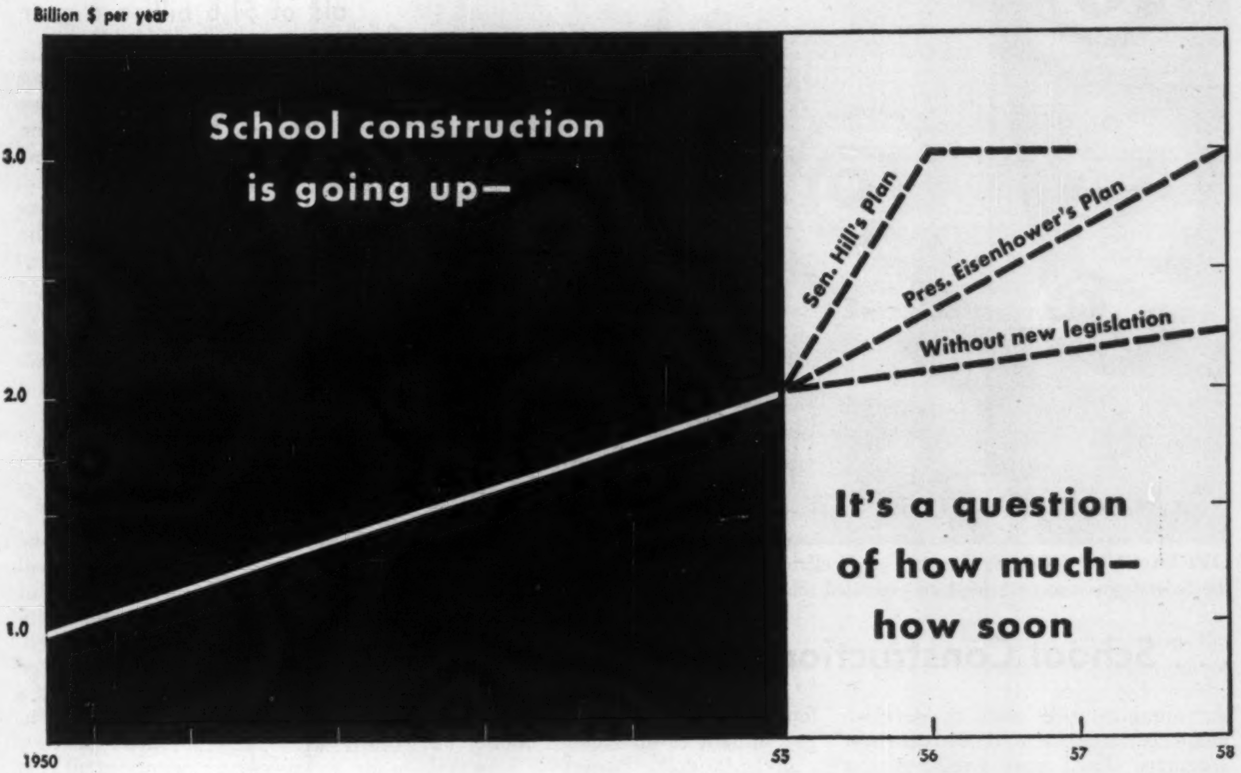


Federal Aid for Schools: The Battle Begins

President Eisenhower's plan to boost school construction has stirred up a first rate political storm in Congress.

Basically, there's general agreement that something must be done to eliminate the classroom shortage. But there is a deep and important difference of opinion over how to tackle the problem.

Most Republicans are lining up behind the President's plan. But most Democrats—and they have at least nominal control, of course—are pushing for a different approach. Instead of the program to "help the states help themselves" that the President proposed, Democrats insist on large-scale federal grants along the line proposed in a bill by Sen. Lister Hill, chairman of the Senate Labor and Welfare Committee.

The clash between these two approaches is sure to produce oratorical fireworks when Congress debates the subject. But observers agree that some new form of federal aid for school construction will be voted this year. The problem, they say, is too serious to postpone.

Nearly everyone admits that what the states and local communities now are doing is not enough. The current school building rate is about 60,000 classrooms a year at a cost of $2 billion. That's almost double the rate in 1950, but it is not big enough to reduce substantially a total classroom deficit estimated at more than 300,000.

Over the last five years, a total of $7 billion has gone into school construction. In his special message to Congress, President Eisenhower said a total of at least that much must be invested in schools during the next three years to maintain the rate of advance in school construction and reduce the total classroom deficit.

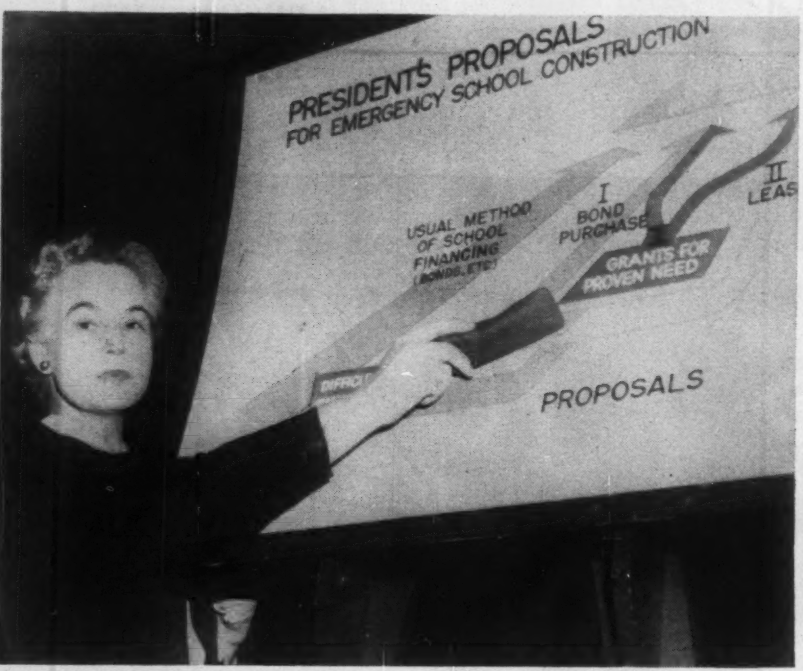
• **Eisenhower's plan**—The President proposed a four-point program. It would make available a total of $1.1 billion in federal funds to stimulate the construction of 200,000 classrooms, costing $7 billion, during the next three years. The President asked:

• Authority to buy $750 million of bonds over the three-year period from school districts that may be handicapped in selling their bonds at reasonable interest rates. The portion of construction costs that could be met with bonds purchased by the federal government would range from 80% of the costs in states with low per capita income to 50% in states with high per capita income. The loans would be repaid within 30 years.

• Federal aid in setting up state school building agencies that would issue bonds, build schools and rent them to school districts on a lease-purchase basis. The federal government would contribute $150 million, or half of a revolving fund equal to one year's debt service on bonds for needed school construction.

• Outright federal grants of $200 million over the three-year period to school districts that lack the economic capacity to carry on their own construction programs. Funds would be allocated to the states on a matching basis according to each state's school-age population. The federal contribution would vary from 40% in the state with the highest per capita income to 60% in the state with the lowest per capita income.

• Federal grants to stimulate development of long-range plans to overcome the obstacles to school construction. An appropriation of $20 million would be allocated to the states on the basis of school-age population to help meet


PRESIDENT'S PROPOSALS
FOR EMERGENCY SCHOOL CONSTRUCTION
USUAL METHOD OF SCHOOL FINANCING (BONDS, ETC)
I
BOND PURCHASE
II
LEAS
GRANTS FOR PROVEN NEED
DIRECT
PROPOSALS

OVETA CULP HOBBY, Secretary of Welfare, explains the President's plan to put the federal government behind an expanded school construction program.

. . . School Construction

the administrative costs of development of state school construction programs. Each state would get at least $25,000 a year.

Supporters of the President's plan claim that it is the most effective way to stimulate school construction while retaining basic responsibility for the program where it belongs, in the states and local communities.

Opponents charge the plan is totally inadequate to the need. They say the states and school districts now are doing all they possibly can do with the resources at their command. And they insist that only substantial federal grants will produce the school construction needed.

• **Sen. Hill's plan**—The bill introduced by Sen. Hill would provide federal grants of $500 million a year for two years. The money would be apportioned according to a formula that varies with the needs of different states and with their school population.

Sen. Hill is expected to push his bill vigorously. What he fears most is an anti-segregation amendment to implement the Supreme Court's segregation ruling. Such an amendment is sure to be offered. If it is pushed through, the risk of killing all chances for action this year would be great.

The Hill bill has attracted most support, but several other bills calling for federal grants to the states have been introduced. In the House, the Bailey-Kearns bill sets no dollar figure but would authorize the federal government to match state money on a dollar-for-dollar basis over a period of five or six years.

Critics of this bill say it would favor the "rich" states—those in a position to put up more money and so draw more grants. An identical bill also has been introduced in the Senate.

Experts agree that without some form of federal aid, the rate of school construction, which has been rising steadily since 1950, might flatten out soon. The big question is whether a two-year program of outright federal grants, as proposed by Sen. Hill, or the President's three-year program of more indirect federal aid would be more effective in getting schools built.

The answer, apparently, lies in how fast states and school districts could take advantage of the procedures outlined in the President's program.

At present only five states—Pennsylvania, Georgia, Maine, Kentucky and Indiana—now have state school authorities that can qualitfy under the requirements of the President's plan. Most states would have to enact legislation to create school authorities.

Local school districts, too, would have to complete a lengthy process to qualify for federal aid. They would have to get their bond issues authorized—in special elections for the most part—and then try to sell their bonds in regular commercial channels before they could determine whether or not the federal aid was needed.

Highway Plan

Sen. Gore introduces bill calling for federal road aid of $1.6 billion a year

Democrats in Congress got the jump on the Republicans in another construction field this week when they tossed a highway bill in ahead of the long-anticipated Eisenhower highway program.

Sen. Albert Gore, D., Tenn., introduced the bill that may become the Democratic highway bill this session. Gore's bill calls for $1.6 billion in federal aid each year over a five-year period.

Substantially, Sen. Gore's bill follows the pattern of existing federal-aid legislation, in contrast to the Administration approach, which is expected to rely on a federal authority to sell highway bonds outside the federal budget.

Sen. Gore, chairman of the Public Works Subcommittee on Roads, will begin hearings Feb. 21. Secretary of Commerce Weeks and Bureau of Public Roads officials have been invited. Sen. Gore also has asked interested groups—contractors, highway users, state officials, and others—to get in touch with the committee if they want to appear as witnesses at the hearings.

Here's how Sen. Gore's bill compares with federal grants as they are now administered (figures are millions of dollars per year):

	Present law	Gore bill
Interstate	$175	$500
Primary	315	500
Secondary	210	325
Urban projects.	175	275
Total	**$875**	**$1,600**

These grants are to be matched dollar-for-dollar by the states.

For the interstate system, the federal government now puts up three dollars for every two contributed by the states, and the federal government now grants $175 million for this program.

Sen. Gore's bill would step up the federal contribution to $500 million; the states would be required to put up one dollar for every two dollars of federal money.

The Clay committee, which has been working on the Administration program, has recommended cutting urban aid from $175 million to $75 million. It also recommended that the federal government finance the interstate system completely by issuing $25 billion of bonds over a 10-year period, the bonds to be paid off eventually out of federal tax revenues.

At ASCE's San Diego meeting:

Professional Problems Draw Most Attention

The American Society of Civil Engineers devoted much time at its convention in San Diego last week to discussion of such professional problems as unionization of engineers, their economic status and engineering education. In addition nearly 80 technical papers were presented.

ASCE President W. R. Glidden touched off the discussion of unionization of engineers. "No other professional engineering society has been so alert to the problem or has expended so much constructive effort in the guidance and protection of its members," Glidden told the convention.

He cited ASCE actions in the field dating back to 1937, including the ASCE policy statement of 1946 which he called a "declaration of three freedoms" for professional employes. These were:

- Freedom to form and administer independent bargaining units.
- Freedom from association with a bargaining unit which includes nonprofessionals.
- Freedom to employment unconditioned by membership in a bargaining unit.

Sterling Green of the Los Angeles Department of Water and Power, a member of the ASCE Committee on Employment Conditions, said that professional employes still are in danger of being included in heterogeneous bargaining units unless they are constantly vigilant or unless they organize a bargaining unit confining its membership to professional employes.

Green cited the Engineers and Scientists of America as an organization that is doing an effective job in helping keep professional engineers out of unions dominated by nonprofessional workers.

• Panel discussion—Four junior members from the Los Angeles section took part in a panel discussion of unionization—attended by more than a quarter of the convention's registration.

Hugh E. Mulholland, the panel moderator, introduced the panelists, who spoke on the subject, "Unions, Unity or Utopia." The discussion concerned methods by which engineers might better their economic position.

H. A. Halldin discussed the advantages and disadvantages of unions and concluded that, in certain cases, unions for engineers may be a necessity, but can be successful only if operated professionally by professional people.

W. J. Keener wholeheartedly endorsed the Engineers Joint Council as the organization with the greatest promise for unity in the engineering profession, but he charged that EJC has done nothing to improve the economic position of engineers. He urged an EJC constitutional provision that would require it to work for the economic betterment of both employers and employes.

Hodge Gaines urged all engineers to help solve these professional and economic problems. "We have no alternative," he said, "either we have unions or (we must have) a unity structure with a strong economic program."

• For better engineers—Maj. Gen. Samuel D. Sturgis, Jr., Chief of the Corps of Engineers called for ASCE leadership in improving the prestige and economic condition of all engineers. Only such improvement, he said, will enable the federal service to attract and retain the technical skills needed for vital federal work.

Harvey O. Banks, Assistant California State Engineer and a member of the ASCE Committee on Engineering Education, spoke on the need for improving engineering education.

He called contemporary formal education for civil engineers inadequate for full professional development, particularly in enabling engineers to form balanced judgments. The thinking process, he said, may be developed by special training in the humanistic, social, political and economic fields. Banks also urged employers to help young engineers in their professional development.

• Urban mass transit—In an afternoon session there was general agreement on the need for mass transit to help solve pressing urban problems. Panelists also agreed on the necessity for subsidies to provide the needed service.

An important difference of opinion developed, however, over whether highways and busses or some rail service such as monorails should be expected to take the lead.

Harmer E. Davis, Director of the Institute of Transportation and Traffic Engineering at the University of California, pointed out that the limits of daily movement in an urban community are set by time rather than by distance. He said peak-hour congestion must be reduced by mass transit to keep the time of travel within reasonable limits. Davis added that mass transit operators must provide superior service to attract patronage.

Stanley Lanham, vice president of Los Angeles Transit Lines, defended the use of busses to solve the problem. He said one bus replaces 40 automobiles, and he called the use of busses on freeways a successful operation, partly because of the large subsidy provided in right-of-way.

George W. Burpee of Coverdale & Colpitts, New York consulting engineers, supported rail mass transit. He said a rail system capable of operating at high speed can transport passengers more rapidly and conveniently than automobiles.

Burpee also contended that, under certain circumstances, rail lines might become self-supporting—a novelty among urban rapid transit systems.

William R. McConochie of De Leuw, Cather & Co. pointed out that mass transit systems need subsidies. He said substantial net operating revenues can be produced, but not enough to pay fixed charges on the structures required for operation of the systems. He suggested public ownership of the physical properties —but not their operation—as the first step toward a more sound economic status for transit systems.

• Engineer manpower—Three members of the University of California's Institute of Transportation and Traffic Engineering—Robert Horonjeff, Norman Kennedy and Harmer Davis —presented a paper on manpower factors in connection with the President's proposed highway program.

They noted that the Highway Research Board had reported that more than 4,000 additional engineers will be required for each $1 billion of additional highway work. The solution to this personnel shortage, they said, lies in relieving professional employes of duties that can be performed by others, using private engineering firms, increasing the use of mechanized procedures like photogrammetric mapping, streamlining office and field procedures and recruiting more young graduates.

• Engineer headquarters—The ASCE Board of Direction considered the report of founder society presidents recommending establishment of an engineering societies center in Pittsburgh, Pa. Noting that the report was on the limited basis of lowest initial and operating costs, the ASCE board recommended a restudy by the presidents on the basis of all factors—not just costs alone.

Texas cowboys (and cowgirls) ride a moving walkway . . .

. . . built on prestressed lightweight concrete girders

Texans on hand for Houston's annual Fat Stock Show and Rodeo leave their cars in the parking area and climb aboard a moving rubber sidewalk that carries them across a pedestrian bridge and into the Houston Coliseum.

The walkway is 114 ft long and rises 12 ft, spanning Buffalo Bayou at a height of 50 ft. It travels 132 ft per min and is capable of carrying 15,000 persons per hour. Vulcanized into an endless loop, the rubber belt is 82 in. wide—probably the widest conveyor belt ever used commercially in this way. It is ⅞ in. thick and reinforced with seven plies of fabric.

Four 14-ton prestressed lightweight concrete girders with 57-ft spans support the walkway, their ends resting on cast-in-place concrete bents. Girder concrete, made with expanded-clay aggregate, developed a 28-day strength of 7,000 psi. Prestress was applied with end-anchored buttonhead wires (Swiss bbr system).

The girders were fabricated by Geo. A. Rackle & Sons Co., Houston, and erected by Peterson Bros. Steel Erection Co. Fisher Construction Co., Houston, is general contractor; Walter P. Moore, structural engineer; and Goleman & Rolfe, architect. The walkway is a joint project of Link-Belt Co., B. F. Goodrich Co., Otis Elevator Co.

Great Lakes Pact

Eight states study plan to foster water control, navigation improvements

A compact designed to foster cooperative action on all matters relating to the Great Lakes and streams flowing into them is to be considered this year by the legislatures of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin.

Ultimately it is hoped that the Canadian provinces of Ontario and possibly Quebec will become parties to the agreement, which becomes effective in the states approving its provisions when four or more states have acted favorably.

The compact is primarily a consultative agreement under which it is hoped to be able to obtain joint action on such matters as stabilization of lake levels, shore protection, improvement of navigation facilities, pollution, erosion control, protection of fish and wild life, power development and diversion of water from or into the basin of the Great Lakes.

The pact sets up a Great Lakes Commission to study all these matters and make recommendations concerning them to the several states and provinces. But the recommendations that will be proposed by the commission are not binding on the signers of the compact.

• **Commission has wide scope**—This commission also would be empowered to make recommendations to the U. S. Congress or the Canadian Parliament, also to the International Joint Commission, which, under the 1909 treaty with Great Britain, has final say on all matters relating to the use of boundary waters or changes in their flow.

In scope, the compact covers the Great Lakes and connecting channels, the St. Lawrence River and "all rivers, ponds, lakes, streams and other water courses which, in their natural state or in their prevailing condition" are tributary to the Great Lakes.

The need for cooperative action by the lake states on such controversial issues as diversions from Lake Michigan by Chicago was first placed before the Council of State Governments in 1951 by Gov. G. Mennen Williams of Michigan. Details of the compact were developed at two conferences of representatives of the eight states held last year under the auspices of the council.

Additional information concerning the compact can be obtained from Nicholas V. Olds, Assistant Attorney General, Lansing, Mich.

Engineers Wanted

Meeting stresses need for men with technical, professional training

Unless more intelligent measures are adopted for the rapid development and effective utilization of our technical and professional manpower, we run the chance of coming out second best in another world war. This sober judgment was the conclusion of a military-industrial conference in Chicago last week.

The conference was sponsored by the Society of American Military Engineers in conjunction with seven industrial agencies, seven governmental agencies and 14 professional engineering societies and associations.

The two-day conference was the first of its kind to be held on such a large scale. Registrations totaled about 1,000. The topic was "Technical Manpower," including scientists, engineers and trained specialists.

Speakers represented industry, technical schools, science, engineering and the military.

They agreed generally that there isn't enough technically trained manpower to go around.

• **Needs of industry**—"The needs of industry for technically trained personnel today are great, and they will become increasingly greater. To an increasing extent, successful technical performance in industry requires a higher and higher level of training; more and more with Ph.D. (Doctor of Philosophy) training. Some way must be found to train and utilize our scientists and engineers with maximum effectiveness. The assignment of technically trained people under the proposed national reserve plan of the Department of Defense should not be left solely in the hands of the military. It should be made by an authority which is not dominated by the military, and in which essential civilian interests are effectively represented."—Robert E. Wilson, Board Chairman, Standard Oil Co. of Indiana.

• **Research and development**—"Two important factors have increased the demand for scientists and trained specialists. One is the advent of billion-dollar research budgets for military purposes. The other is the birth of the massive new technological area of nuclear energy research and development. In the overall picture the field of technology can absorb up to 35,000 engineers annually and 4,500 scientists at the doctorate level. These probably are conservative figures. This may be indicated by the fact that our present labor force of engineers is about 600,000 and at a standard rate of 3% for death and retirement will require for this reason about 18,000 annually."—M. H. Trytten, Director of the Office of Scientific Personnel, National Research Council.

• **How we stand**—"There is substantial evidence that our technological superiority, a keystone of national defense, is being threatened by the rapid build-up of engineering manpower in Russia. During the last four years, Russian schools have graduated 154,000 engineers, compared with 116,000 in the United States. Currently, however, this country has about 100,000 more engineers than the Soviet Union. To increase our technological manpower, early identfication of potential engineering talent and interest is important. This should begin in the upper grades in the elementary school. High-school curricula should include more mathematics and science. For the student intending to study engineering or science in college, it is desirable that his high-school training include three years of mathematics, two of science, three of English and one of history."—John T. Rettaliata, President, Illinois Institute of Technology.

• **Atomic age**—"By force of necessity our present generation and those to come must be educated to live in an atomic age. Our educational system presently is incapable of meeting this challenge. It is not producing young scientists, engineers and technicians in the numbers which we require. The shortage of qualified new teachers is the most serious aspect of the overall problem. Poor students beget poor teachers who produce poorer pupils. We will soon need 10,000 new science teachers annually, but our colleges will be producing qualified candidates at the rate of only 5,000 per year. This trend bodes ill for our future in the atomic age."—Leslie R. Groves, Lt. Gen. U.S.A. (Ret.), Vice President, Remington Rand, Inc.

At the conclusion of the two-day conference a four-point objective was adopted which said, in effect: The present serious shortage of scientific and engineering personnel for military, industrial and educational needs will become critical in the event of an emergency. More emphasis must be directed toward increasing the supply of well-trained scientific and engineering personnel. Our program for selective service and the use of military reserve forces must insure that technically trained personnel be effectively used where they are most needed and of most value in behalf of the nation's best interest.

St. Lawrence Labor

Canadian construction gets single labor pact

A far-reaching labor agreement affecting virtually all construction work on the Ontario side of the St. Lawrence Power Project has been concluded in Toronto between The Labour Relations Association St. Lawrence Power Project and the Allied Construction Council. Effected under the auspices of Ontario Hydro-Electric Power Commission, it is considered one of the most significant labor contracts in the history of Canadian construction.

Broad in scope, it provides a common ground for competitive bidding, and establishes the power project labor pattern for OHEPC's own forces, its contractors, and their subs. Full details have not yet been disclosed, but typical of the rates it sets are $1.25 to $1.40 for laborers, $1.40 to $2.33 for electrical workers and $2.15 for carpenters.

It establishes a 44-hour week with bonus payments for odd-hour shifts, recognizes eight statutory but only two paid holidays, contains insurance and savings plan provisions, and provides voluntary hospitalization coverage for laborers. Employes will be entitled to Ontario workmen's compensation and Canadian unemployment insurance benefits, and will come under the government's vacation pay scheme for casual workers. Hospital facilities, now under construction by OHEPC, will be available to all workers.

Keystone of the agreement is The Labour Relations Association, recently formed to afford management the "common voice" which the 17 participating AFL unions had previously found in their Allied Construction Council. The association will embrace OHEPC and the contractors it engages. Subcontractors on the power project will be required to subscribe to the agreement.

Although the contract contains the specified wage schedule for the power project, it does not prohibit payment of incentive wages. If paid, however, the cost must be borne by the employer and does not become subject to the renegotiation provisions under which adjustments will be made between OHEPC and contractors for wage increases or decreases.

In drawing up the agreement, suggested by the successful application of the council principle to the Niagara Falls power project, OHEPC sought to solve the "exceptionally difficult problems" that might arise "in consequence of the international character of the undertaking."

Somervell Dies

First engineer general to win four-star rank was head of Koppers Co.

Gen. Brehon Burke Somervell, 62, for many years a major figure in the parallel worlds of construction, the Army and (since 1947) big business, died last week at home in Ocala, Fla.

At his death, Gen. Somervell had completed seven years as chairman and president of the Koppers Co., of Pittsburgh, a post he had held since his retirement from active military service as commanding general of the Army's Service Forces in 1947.

A slim, spare, precise man, not given to wasting words or actions, Gen. Somervell made the Army's Corps of Engineers his career almost from graduation from West Point, in 1914. He was adjutant (and one of only two regular officers assigned), to the old Fifth Engineers, first U. S. Engineer regiment to reach France in World War I.

- **Peace time**—Returning to the United States in 1920 after serving with the Army of Occupation in Europe, Somervell (who had reverted to his permanent rank as captain) spent the next five years on routine assignments for the Corps of Engineers. But in March 1925, he was granted a special leave of absence to make a survey (with Walter D. Hines) of navigation conditions on the Rhine and Danube Rivers for the League of Nations.

He returned again to the United States, spent a year at the Army War College and four years in various posts in charge of river and harbor work for the Office of the Chief of Engineers. Then followed several months as head of the Mississippi River Commission and two years as assistant district engineer in the Memphis district.

He went overseas again in 1933, at the request of the Turkish government, to make a year-long economic survey of that country—a connection that, 17 years later, was to result in Koppers Company taking a major part in the development of the Turkish coal port of Zonguldak (ENR March 16, 1950, p. 100).

Although it was more an administrative than an engineering job, the work that probably brought Somervell most prominently to the public notice was his assignment, in 1937, as Works Progress Administrator for the City of New York. At that time the WPA rolls in the city carried 230,000 persons, and the agency was at its lowest point, ridden with dissension and left-wing activity.

Somervell proved to be more than a match for these elements, and his four years of hard-boiled but efficient service earned him a national reputation as an administrative genius.

- **War again**—Recalled to active service in December 1940, he was assigned to head up the Construction Division of the Quartermaster Corps, and, in a series of rapid advances in rank and responsibility, moved up to head the Army Service Forces. His motto. "The difficult we do at once, the impossible takes a little longer," became a wartime by-word.

Never a man to avoid controversy Somervell was alternately praised and criticized for his actions. He won the highest possible commendations from all concerned for the magnificent job his force performed in supplying the invasion of the European continent and further actions; he was criticized roundly for his handling of the ill-fated Canol oil pipeline in the Yukon.

Early in 1947 he retired from active Army service and was elected to his post at Koppers. One of his first actions there was a complete reorganization of the company's top command and an increase in the company's engineering services.

New York Utility to Build Own Nuclear Power Plant

Atomic power made the grade as a full-fledged commercial enterprise last week when Consolidated Edison Co. of New York disclosed plans to build a plant at Indian Point on the Hudson River near Peekskill, N. Y.

Power from the Indian Point installation, estimated to cost up to $40 million, would be fed into Consolidated Edison's New York City grid.

H. R. Searing, company president, told the Joint Congressional Committee on Atomic Energy, that his firm will carry through the project without federal subsiday for either fuel or capital costs.

The company expects to apply for an AEC license by April 1.

Houston Approves Plan For Port Development

The Houston Port Commission has approved a long range plan calling for the eventual construction of 15 docks and terminal facilities to cost at least $32 million.

The plan was drawn by Lockwood & Andrews and Robert J. Cummins, Houston consulting engineers, for the development of unused land on the north side of the Houston Ship Channel.

The Port Commission also approved a proposal to order a cost study of five of the docks in the master plan.

Calumet Skyway

Chicago gets big check from sale of toll bonds for $86-million project

Chicago's Calumet Skyway toll bridge project cleared its last financial hurdle last week when the city received a check for $84.3 million from the sale of bonds.

It was one of the largest single financial transactions ever made by the Windy City. A previous payment of $1.7 million had been made to the city by the investment syndicate of 102 banking firms that bought the $88 million worth of 3⅜% bonds last December (ENR Dec. 30, 1954, p. 17).

Of the $86 million, about $17 million will be earmarked for acquisition of right-of-way and some construction during 1955, according to Public Works Commissioner George L. DeMent. Real estate appraisers will begin negotiations immediately to secure right-of-way. Construction is expected to get under way late this summer. Completion is scheduled for Jan. 1, 1958.

The 8-mi toll project will connect with Indiana's east-west toll road at the Illinois-Indiana state line and run northwest to connections with State St. in the vicinity of 66th St. It will be elevated for most of its length, passing over Calumet River on a high-level fixed bridge—from which it gets its name.

DeLeuw, Cather & Co., Chicago, are general consultants on the project. Consulting engineering firms who will prepare the designs and contract estimates have not yet been announced.

Snowslide Upsets Towers Carrying Power to Kitimat

A freak snowslide tore three electric power-line towers from their moorings and halted operations of the big Aluminum Company of Canada smelter at Kitimat in British Columbia.

The transmission lines feed power to Kitimat from Kemano, 51 mi away, over a mountain range. The two lines are single-circuit, one carried by conventional steel towers, the other by specially designed aluminum towers.

When the towers were built, precautions were taken to meet snowslides downward from the mountain peaks But the "freak" slide moved diagonally across the face of the mountain, gaining terrific weight as it advanced. One steel and two aluminum towers were carried away.

Engineers reported that the snowslide was "one-in-a-million" and might never occur again in the same way

Tolls and Trolleys

Objections on two points may delay parkway start

Pittsburgh's $150-million, 20-mi Penn-Lincoln Parkway project has encountered two unexpected challenges that could seriously delay the start of tunnel and bridge construction.

Four state legislators from the Pittsburgh district have asked the state legislature to disband the Fort Pitt Tunnel Commission and forbid construction of the tunnel as a toll project.

The Pittsburgh Railway Co. has filed a protest with the State Public Utility Commission over the fact that the present plans for the double-deck Fort Pitt Bridge, which will feed the tunnel, make no provision for trolley tracks.

The utility firm's protest already has caused one delay. The State Highway Department has had to hold up award of contracts totaling $1.2 million for relocation of a street and construction of ramps for the bridge.

Groups protesting toll financing of the Fort Pitt tunnel are making the point that the parkway's Squirrel Hill tunnel was built with public funds. In reply, the State Highway Department claims that the $19-million project would have to wait at least 12 years unless built as a toll facility.

The street railway firm says that present plans will leave it with no link between its lines in Pittsburgh and those on the other side of the Monongahela River. The Point Bridge, which now carries the trolley tracks, is to be torn down.

The company is asking that either the Point Bridge be left standing or tracks be laid on the new structure. As to the latter, the State Highway Department retorts: "Tracks on the Fort Pitt Bridge would defeat its purpose—to carry an uninterrupted flow of high-speed traffic."

Gov. Johnson Prods Agency To Get Started on Tunnel

Gov. Edwin C. Johnson has ordered officials of Colorado's State Highway Commission to "roll up your sleeves" and get construction started this year on a highway tunnel under the Continental Divide.

"It's time we quit talking about the tunnel and built it," Johnson said. He told the commission he saw "no reason why a satisfactory site can't be selected and work started before the end of this year."

Although no site for the tunnel has been selected, highway officials have detailed engineering reports on three prospective sites. Johnson said he believed the project would cost about $12 million and could be financed, in part, at least, from the $35 million in anticipation warrants voters authorized last fall for highway construction. He said he expected the tunnel would become eligible for federal aid as an interstate highway once work gets under way.

Western Contracting Co. Is Apparent Low Bidder

Western Contracting Co. of Sioux City, Ia., was the apparent low of 11 bidders for the Stage 4 earthwork contract on Oahe Dam, near Pierre, S. D. Western bid $5.1 million. Government estimate for the job was $4.6 million.

The contract calls for placing 16 million cu yd of earth on the left bank of the Missouri River. Col. Thomas J. Hayes, Omaha District Engineer, said the Stage 4 work will bring Oahe's embankment to 56% of completion.

Oahe will be the largest rolled earth dam in the world. It will be 242 ft high, contain 78 million yd of earth and will hold back twice as much Missouri River water as flowed past Omaha, Neb., last year.

Indiana to Save $26 Million On East-West Toll Highway

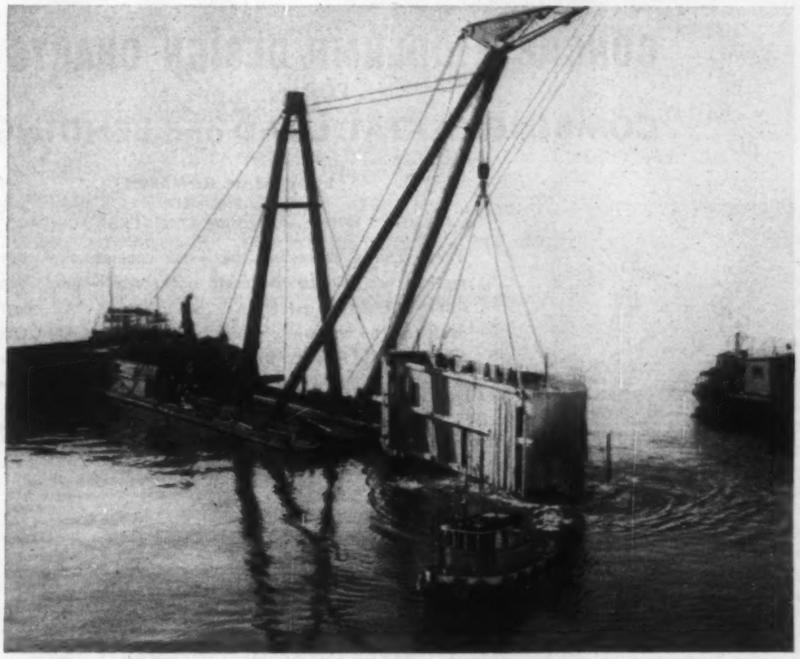
The Indiana Toll Road Commission said in its first annual report that a net savings of $26 million may be expected in construction operations of the state's $280-million, east-west toll highway.

The commission's engineers reported that construction bids up to the first of this year averaged 27%—or $28.5 million—below estimates. This not only lowered construction costs; it also reduced design and consulting engineering fees which are based on a percentage of construction costs.

The breakdown showed additional savings of $1.1 million in design engineering fees and $445,000 in consulting engineering fees. Total savings on the project amounted to more than $30 million.

Right-of-way costs, however, were $4 million over estimates up to last November, making the net savings about $26 million.

The report also showed that about $245 million of the $280 million bonds sold Dec. 17, 1953, was invested in U. S. government securities and yielded a gross return of $4.3 million up to the end of 1954.



Caissons Form Base for Ferry Slip

Three 500-ton concrete caissons have been placed in the harbor at Vancouver, B. C., to form the base of a new ferry slip for Canadian Pacific steamship operations. The caissons were built in drydock by British Columbia Bridge and Dredging Co., Ltd., and floated two miles to the site. They were sunk to a gravel mat 32 ft below average low tide. A total of 74 H-piles were driven through three caissons into the bay bottom. Holes through which the piles were driven had been sealed with timber to keep the caissons watertight during towing. After piledriving, the caissons were filled with a tremie concrete. The ferry slip will berth the Princess of Vancouver, a new ferry due to begin her run in May.

YOU can design reinforced concrete columns in 10 SECONDS *easily, accurately . . .*

BY USING
THIS **NEW**
DESIGN HANDBOOK

NO CALCULATING!
NO GUESSWORK!

TYPICAL PROBLEM

GIVEN: f'c = 5000 psi fs = 20000 psi
Bending Moment = 200 ft. kips
Axial Load = 200 kips

FIND: Minimum square spiral column size and amount of steel reinforcement required.

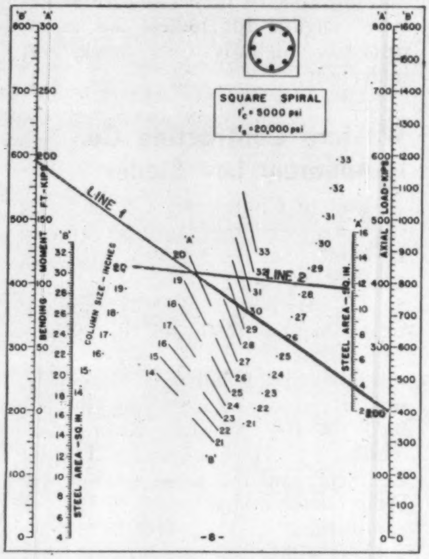
SOLUTION

Line 1 on chart intersects line representing 20" column size. Line 2 indicates 11.6 sq. in. of steel required.

DESIGN TIME:

ONLY 10 SECONDS

WHAT COULD BE SIMPLER?



TYPICAL CHART—ACTUAL SIZE IS 8½x11

Just Published . . .

CONCRETE COLUMN DESIGN CHARTS
FOR
COMBINED AXIAL LOAD and BENDING

By WILLIAM N. MASON
CIVIL ENGINEER
FORMERLY WITH S. F. NYDAM CONS. ENGR., CHICAGO

These charts represent the most concise and rapid method yet devised to design eccentrically loaded reinforced concrete columns . . . of any type. All charts are based on column formulas of the AMERICAN CONCRETE INSTITUTE BUILDING CODE 318-51, the accepted standard for concrete design and construction.

SAVES HOURS OF DESIGN WORK

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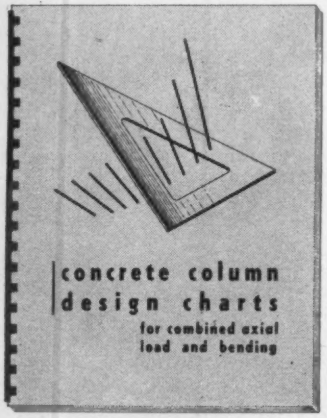
FREE
EXAMINATION

Mail TODAY Without Money!



CONTENTS

- Square Spiral Columns
- Round Spiral Columns
- Square Tied Columns
- Reinforcement in 2 sides
- Square Tied Columns
- Reinforcement in 4 sides
- Rectangular Columns
- Long Columns

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Please send me...........copies of CONCRETE COLUMN DESIGN CHARTS for 14 days' examination on approval. In 14 days I will remit $3.00 for each copy I keep or return books postpaid.

NAME.................................
ADDRESS..............................
CITY ....STATE........
COMPANY..............................

CITY BY CITY

Landlord's Dilemma

Pittsburgh—Three of Pittsburgh's biggest slum landlords are going to have to renovate or raze some 400 substandard structures when the new city housing code goes into effect March 1.

The "big three" in landlords are the city itself, the city school district, and Allegheny County. They jointly own millions of dollars worth of slum properties that were taken over when owners could not pay taxes. Together they collect rents totaling about $192,000 a year. All three already have announced that they will either renovate the properties or bring them up to standard, in line with a provision of the code which requires all landlords to restore slums to decent living levels.

Environment Improvement

Detroit—Plans for a $270,000 study of "environmental health" in metropolitan Detroit have been launched by the National Sanitation Foundation, located at the University of Michigan.

The research group will seek financial backing from the city's manufacturing firms for a $30,000 equipment fund; $50,000 field laboratory; $100,000 research study; $40,000 symposium fund; $20,000 education fund, and $30,000 for assembling data.

A long-range detailed examination of Detroit's air, water, sewerage system, food and shelter is planned. Another aspect will be observation of radioactive ash—an increasing problem with peacetime use of atomic energy.

Researchers will be housed in a newly constructed wing of Herman Kiefer Hospital, Detroit. Dr. Henry F. Vaughan, dean of the University School of Public Health and former Detroit Health Commissioner, is president of the foundation.

"We are concerned with improving man's entire environment, which basically consists of the air, food and water he consumes, and the physical and psychological conditions under which he lives and works," reports Dr. Vaughan.

Sanitation Slowdown

New York City—New York City is trying to get a five-year extension on a 1959 deadline for cleaning up pollution in its surrounding waters.

The deadline was set in 1948 by the Interstate Sanitation Commission. At that time the city started an 11-year, $250-million program for removing pollution. This program is now two years behind the original schedule.

The interstate agency has announced that it will defer consideration of the time extension for a year. Meanwhile, the city is to resubmit a two-schedule program covering the remainder of its pollution control construction.

One schedule calls for sewage treatment facilities costing some $22 million. This would end the first phase of the program—cleaning up the principal recreational waters. The city was supposed to finish this first phase by the end of 1953. But a shortage of mechanical and electrical engineers made it impossible to complete the task on time.

The other schedule—a start on the second part of the program—includes construction totaling about $19.5 million. This phase would free all remaining water of sources of pollution.

During 1955 the city is expected to plan its remaining construction and set up dates for starting the work.

The commission reportedly is satisfied that the city's appropriations are assurance that pollution work is being continued. It indicated that this is the reason why the request for more time was not turned down. However, the commission still is not certain that an extension of five years is needed.

Referendum on Parking

Norfolk—Voters will be asked to pass on whether or not the city market building and an old armory should be sold to a private firm, which would erect a commercial building that would provide parking facilities for 400 cars in the downtown business section.

The City Council voted to sell the properties to the Rennert Garage Co. of Baltimore, Md., for $345,000 with the proviso that the company erect a $2-million building and provide the 400-car parking facilities.

Firms and individuals doing business in the city market initiated petitions calling for the referendum.

It's an Ill Wind

Phoenix—The city of Phoenix has just picked up the check for a $20,000 breeze.

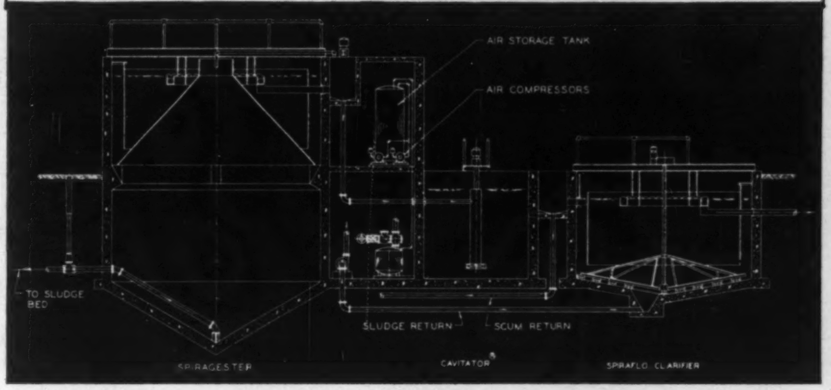
Despite baffle boards at the edge of Sky Harbor Airport, property owners complained that airliners on the warm-up pad showered their homes with gravel and dust, blew crops from trees, and jiggled light fixtures.

Rather than enter into a suit with the property owners, the city bought three acres for $20,000—the amount of the suit.

YEOMANS presents

THE Cavitator* SYSTEM

for Municipal Waste Treatment



One of the many possible arrangements is illustrated. The secondary treatment is provided by the Cavitator mechanism, a specially designed rotor with two arms mounted on a hollow shaft through which air is drawn for dispersion through the tank contents. The arms are streamlined with the outer ends so constructed that when they are passed through the liquid at relatively high speeds they create a zone of cavitation through which the liquid is recirculated continuously. Air and liquid are drawn into the cavitation zone under vapor pressure conditions. As the bubbles rise they implode with such tremendous force that the pressure actually drives the oxygen into the tank.

- **high oxygen transfer efficiency**—requires only 135 cu. ft. of air per lb. B.O.D. removed per day in the Cavitator system.
- **exceptional performance on relatively low flows** with high B.O.D.
- **low installation and operating cost** with a high degree of purification.

Primary clarification and digestion is accomplished in a single structure, the Spiragester. A Spiraflo is used for clarification.

Secure detailed information. See your local Yeomans representative listed in the Yellow Pages of your telephone book under "Pumps" or contact factory direct.

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Manufacturers of: Distributors • Clarifiers • Digesters • Mechanical Aerators
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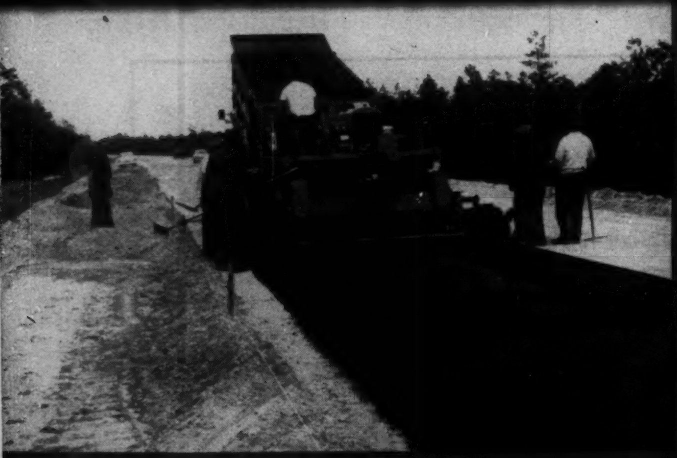

[illegible] Bituminous Paver laying [illegible] on the Garden State Parkway in New Jersey.

The State of Pennsylvania has always been very particular about its asphalt roads. The Blaw-Knox has been approved by the Highway Department of the Commonwealth of Pennsylvania.

The Outer Drive Extension in Chicago—a county job—Here the Blaw-Knox Paver helped to complete the job before the deadline.

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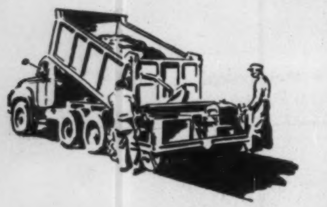
BLAW-KNOX
Bituminous Paver
Check List

If you don't have these Bituminous Paver advantages you are losing money!

- ***Wheel Steering*** with long wheel base eliminates the over-steering of crawlers and assures greater accuracy, a smoother course and better joints.
- Wheel mounting eliminates the 600 to 700 parts characteristic of crawlers.
- Wheel mounting absorbs vibration, reduces chatter in screed and wear and tear on machine.
- Dual Controls — handle machine from either side.
- Handles boxcar trucks with ease.
- Compacts to uniform density and automatically measures and levels.
- Long wheel base and leveling principle equalizes ordinary subgrade irregularities.
- Simpler, more easily adjusted crowning device.
- Easily tows to new location and gets back to lay parallel course in a quarter of the time required for crawlers.
- Easy conversion for increased width.
- *Outproduces any other asphalt spreader on the market today.*

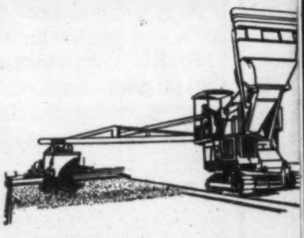


ADNUN JR.

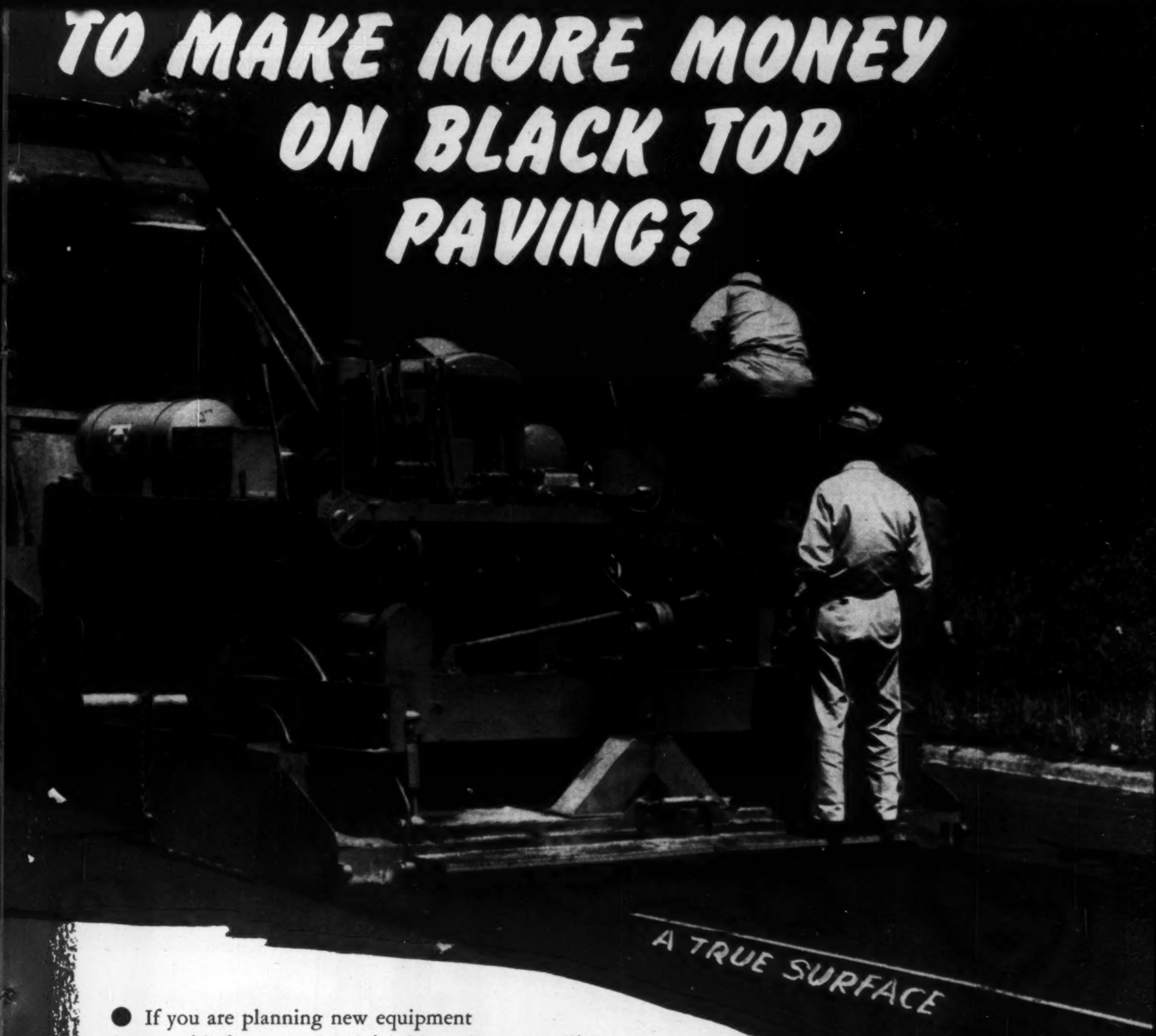
For those driveway and parking lot jobs the Adnun Jr. will make money. Power saves truck time. Continuous Course Correction gives a smoother surface—and it tows to the job — no trailer is required. Ask for a Catalog.

MULTI-FOOTE

The MultiFoote Concrete Paver has long been a standard for highway paving. Shovel-type crawlers with self-cleaning action, fast charging and discharging, and better vision, mean greater output on the job. Ask for a Catalog.



TO MAKE MORE MONEY ON BLACK TOP PAVING?



● If you are planning new equipment for your black top paving jobs this spring you will be making a serious mistake if you do not get full details on the Blaw-Knox Bituminous Paver.

There has never been anything like it for speed of spreading and for smoothness of surface. Wheel design at once improves control and eliminates some 600 to 700 parts present in crawler units making upkeep easier and less costly.

Wheel design simplifies transportation and reduces truck standing time by easier, faster relocation on the job. With the Blaw-Knox you pave profitably with *any* mix, hot or cold. You pave with automatic leveling and compact to uniform density. You pave with a permanent bond between strips and you pave with the only paver that gives you positive traction at *all times.*

Even if you feel your present equipment is adequate you may cut your costs and increase your profit by replacing it with a Blaw-Knox. You owe it to yourself to get all the details.

On wheels it will pave for less

BLAW-KNOX COMPANY
FOOTE CONSTRUCTION EQUIPMENT DIVISION
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800 FORD TRACTORS!

30% More Power to help you get jobs done on time. Ford's advanced "Red Tiger" engine powers the new 800 series Ford Tractors . . . delivers 42.5 belt and 35 drawbar horsepower.* Here's extra power to move more dirt, handle heavy work loads easier, do more jobs faster!

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*Manufacturers Rating

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Ford
TRACTOR

A Growing Economy and Longer Range Planning Propel Construction at Faster Pace

• •

Continued from Front Cover

Looking ahead is of course a long-practiced activity of engineers and construction men whose projects require many years between conception and construction and additional long periods to complete. But while they are accustomed to long-term planning as applied to specific projects, a concern for the future of construction as a business or even their own part in this future has enlisted their attention for much shorter periods ahead—a year or two, or at most five.

Recently, however, there has been a noticeable shift to much longer-range planning, if not yet by the construction man at least by one of his biggest customers —American business. And the same trend is discernible in government—another important construction buyer. The next decade, even the next two, are being discussed with a frequency and familiarity that are altogether new and stimulating.

There is probably no single cause to which this shift of focus can be attributed, but it seems certain that successes in the field of nuclear fission played a prominent part. Faced first with the possibility, then with the certainty that atomic power was going to be practical, but not for perhaps a decade, planners had to begin to think in terms of what would happen then—or could be made to happen. If, as some authorities have predicted, a quarter of the new power installations twenty years from now will be based on atomic heat, that fact must be taken into account now.

But another development, which has caused our focus to be shifted farther ahead, is the rise in influence of the economist. Both as advisers to business and government and as writers and lecturers whose words (simpler and more understandable than was once the case) reach the general public, the economists have helped change thinking habits about the future. As a result of their efforts, population trends are studied as avidly, perhaps also as widely, as those of the stock market. Economists also have made gross national product, and its distinguishing initials, GNP, household terms. All this has had its effect on the shift to long range planning—or LRP as it is sure to be called if its popularity continues to grow.

In any event, with business and government looking ahead as much as twenty years, a similar new dimension must be given to construction planning. And it is by no means an unwelcome requirement, for the result should be the introduction of a new factor of stability into the construction business. For when the whole nation is led to set its sights on the practicability of attaining a fifty percent growth in the gross national product in the next two decades, investment in construction is certain to be more continuous and recessions less prolonged.

In 1955 the influence of this long range planning will be in full sway. A highway plan and a school plan are already in the making. Business planning encompasses increased investment in commercial building and a continued high level of factory construction. Population growth demands housing, and such community facilities as water supply and sewerage. In the pages that follow this planning is particularized, and the economic, engineering and construction trends and developments available to implement the planning are described. A good year is ahead for construction, and more good years are assured as our growing economy continues to grow.

A Good Year Is Over; a Better One Coming

The outlook—volume will rise, but competition will be tight. Costs will go higher, with most materials easy to find

Heavy construction put on a remarkable show in 1954, and it will do better in 1955. After reaching a record volume in 1953, contract awards reported to ENR slumped badly during the first quarter. By the end of March, awards were 34% behind the same 1953 period. Then the picture changed abruptly.

Contracts set a new record for the second quarter of 1954, and the upturn continued through the third quarter. While new contracts tapered off in the last three months of the year, volume remained very high. Total awards for 1954 were $14.4 billion, only 3% below the 1953 total on the basis of average weekly awards. ENR's estimate for 1954, published one year ago, was that awards would total $14.4 billion for a 3% decline. So this forecast was a bull's-eye for the over-all total.

• **1955 forecast**—ENR expects the strong uptrend in heavy construction that began in the second quarter of last year to continue in 1955. Contract volume should rise 8.5% to a near-record $15.6 billion this year (For details, see table in column three). That would be surpassed only by 1952's total of $15.7 billion, when large atomic energy plant contracts contributed a whopping $2.3 billion.

• **1954 review: the leaders**—Highways, commercial building, and private mass housing sparked the 1954 upturn. Contracts in all three categories set new records for the year. Based on average weekly volume, both commercial building and housing were up 25% over 1953, with a 9% gain for highway contracts. Waterworks climbed 2% to a new record.

While not setting new highs, these types also increased in 1954: nonresidential public building, up 3%; and public unclassified work—mainly federal airports and tunnel projects—up 11%.

• **Laggards**—These categories declined sharply in 1954: private industrial building, down 40% to the lowest figure since 1949; bridges, off 31% from 1953's unusually high level; public housing, a 31% decline; and private unclassified (mainly pipelines), down 30%. Declines also came in sewerage contracts and in earthwork, irrigation & drainage awards. Both types were off 8%.

• **Regions**—Regionally, the 1954 picture was mixed. New records were reached in New England, Middle Atlantic, and in the West-of-Mississippi. Volume dipped 2% in the Far West, but was off 16% in the Middle West and 24% in the South (chart, page 54).

• **The 1955 forecast analyzed**—ENR estimates a 7% gain in private awards, and an 11% gain in public work. State and municipal contracts are expected to rise 12%, while a rise of 9% is forecast for federal work.

Much of the increase in public awards depends on an estimated gain of $436 million in highway contracts. Again, part of this gain in highway work will be affected by the speed with which Congress approves some form of over-all approach to the highway problem.

Elsewhere in the field of public works, sizeable gains are predicted for earthwork, irrigation & drainage contracts, and in non-residential building.

For private construction, ENR expects substantial gains in all categories. From the standpoint of dollar volume, the biggest gain is expected in housing, with a 4% projected increase. But a $165-million gain is also forecast for unclassified private contracts, which are projected at 28% above 1954.

Heavy construction forecast

'55 contract awards up 8.5% to near record $15.6 billion.

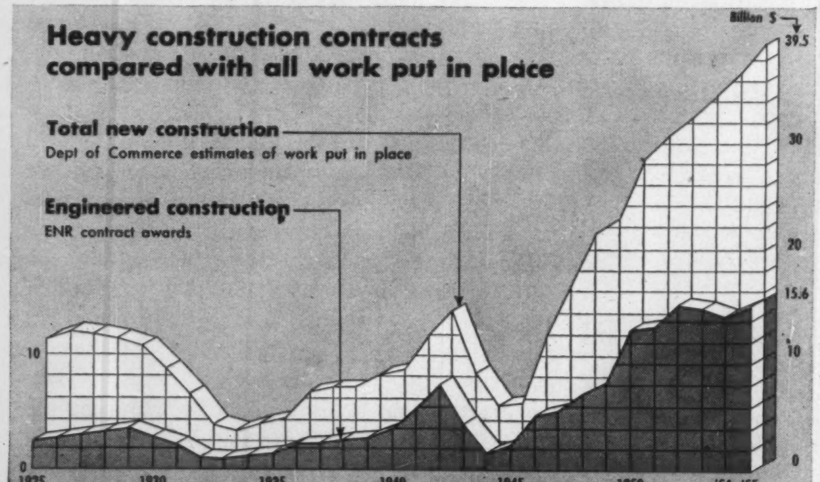
Type of work	Actual 1954	Forecast 1955	% chge '54–'55
Total	**$14,412†**	**$15,640**	**+8.5**
Private	**8,125†**	**8,660**	+7
Public	**6,287**	**6,980**	+11
State and municipal	5,001	5,580	+12
Federal	1,286	1,400	+9
Public			
Waterworks	245	250	+2
Sewerage	388	410	+6
Bridges	510*	525	+3
Highways	1,919	2,355	+23
Earthwork, irr, drain	339	475	+40
Building, excl. housing	1,762	1,860	+6
Housing	255	230	−10
Unclassified	880	875	−1
Private			
Housing	4,232	4,400	+4
Commercial	1,421†	1,520	+7
Industrial	1,876	1,990	+6
Unclassified	585	750	+28

* Incl. $11 mil. privately awarded bridges
† Revised (ENR Jan. 13, p81)

• **Government forecast**—By comparison, BLS and the Dept. of Commerce predict that work put in place this year will better the 1954 high by more than 6%, with a dollar total of $39.5 billion. This estimate depends largely on: new private homes, up 13%; highways, up 18%; public schools, up 16%; and military construction, up 18%. Work put in place always totals much higher than ENR contract awards, because the government estimates dollar value of all construction while ENR screens out the smaller projects (ENR—Jan. 6, p. 74).

The record volume of work put in place was the strongest single upward force in the economy last year. Construction increased its percentage of total U.S. output (gross national product) to 10.4% (chart, column three, page 54). This was the second consecutive yearly increase and the largest share of total output since 1928. The government estimate is that this ratio will increase to nearly 11% in 1955.

If you add the $14 billion expected to be spent for maintenance and



Contracts dip to $14.4 billion, make '54 third highest year

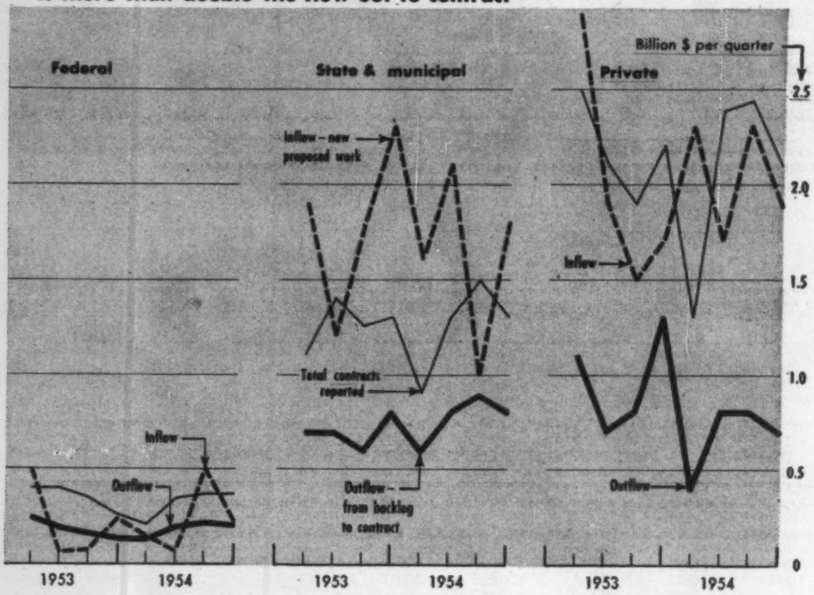
Engineering construction is 3% under average week in '53, but highways, private mass housing and commercial top '53 highs

	Public Works Contracts									Private Contracts							
						Buildings					Commercial Buildings		Construction				
States	Water-works	Sewer-age	Bridges†	Earth-work Irr.-drain	Streets and roads	Resi-dential	Other	Unclassi-fied†	Federal govern-ment work	Industrial buildings	Resi-dential	Other	Private	Public	1954 Total 52 weeks	1953 Total 53 weeks	% Change '53 '54 based on av. wk.
UNITED STATES																	
1954	**245,228**	**387,890**	**510,657**	**338,781**	**1,918.870**	**255 032**	**1,761,972**	**1,494,585**	**1,285.679**	**1,878,309**	**4,232,027**	**1,420,702**	**8,125.299**	**6,285,734**	**14.412,033**	....	**−3**
1953	247,011	431,200	752,275	374,251	1,792,452	375,505	1,736,483	1,662,494	1,417,572	3,178,129	3,464,156	1,156.937	8,665,316	6,505,577	....	15,170,893	......
% Change	+1	−8	−31	−8	+9	−31	+3	−10	−8	−40	+25	+37	−3	−2	**−3**	....	......
NEW ENGLAND																	
Me.	149	646	12,287	617	36,718	921	7,330	15,806	16,232	13,160	1,850	6,612	21,622	74,474	**96,096**	74,889	+31
N. H.	526	......	2,834	34	8,658	346	2 323	30,963	31,345	1,008	1,800	1,926	4,798	45,620	**50,418**	74,362	−31
Vt.	175	246	945	......	5,369	......	3,082	575	614	864	300	....	1,164	10,392	**11,556**	9,456	+25
Mass.	10,753	19,858	20,026	2,943	64,664	5,680	79,538	33,934	33,766	42,191	30,757	30,456	103,851	236,949	**340,800**	288,745	+20
R. I.	1,178	2,748	4,197	100	2,738	1,204	9,856	5,801	7,567	655	1,160	5,126	7,118	27,645	**34,763**	48,079	−26
Conn.	1,996	3,655	6,777	415	5,736	1,913	45,087	3,938	2,981	37,825	58,289	34,614	134,211	66,034	**200,245**	139,430	+46
1954	**14,777**	**27,153**	**47,066**	**4,109**	**123,883**	**10,064**	**147,216**	**91,017**	**92,505**	**95,703**	**94,156**	**78.734**	**272,764**	**461,114**	**733,878**	....	+18
1953	20,555	18,318	20,685	4,751	71,563	52,537	109,348	109,726	62,192	72,439	76,269	78,770	276,952	358,009	....	634,961	......
% Change	−27	+51	+132	−12	+76	−80	+37	−15	+52	+35	+26	+2	+0.4	+31	+18	....	......
MIDDLE ATLANTIC																	
N. Y.	6,395	35,756	49,183	8,023	213,393	65,220	177,148	122,558	67,023	55,227	612,769	212,073	886,222	671,523	**1,557,745**	1,451,152	+9
N. J.	1,144	6,118	40,663	2,684	51,953	11,117	22,340	18,552	21,141	140,563	212,177	23,928	381,163	150,076	**531,239**	573,716	−6
Pa.	11,082	33,320	35,803	4,080	120,421	5,011	121,352	15,080	21,692	129,900	530,255	187,760	848,435	345,629	**1,194,064**	886,681	+37
Md.	10,285	8,588	12,753	725	51,158	7,069	57,074	12,099	44,262	28,312	145,162	32,344	206,472	159,097	**365,569**	333,429	+12
D. C.	183	2,547	606	425	8,083	2,422	25,141	896	22,211	1,307	35,648	27,980	64,935	40,303	**105,238**	67,887	+58
Del.	......	2,244	1,454	561	4,761	......	7,544	12,702	12,799	10,414	42,339	8,004	60,757	29,266	**90,023**	87,328	+5
1954	**29,089**	**88,573**	**140,462**	**16,498**	**449,769**	**90,839**	**410,599**	**181,887**	**189,128**	**365,723**	**1,578,350**	**492,089**	**2,447,984**	**1,395,894**	**3,843,878**	....	+15
1953	30,246	115,501	175,262	22,587	590,754	95,059	382,884	144,178	170,138	277,978	1,235,720	330,024	1,857,358	1,542,835	....	3,400,193	......
% Change	+2	−22	−18	−26	−22	−3	+9	+29	+13	+34	+30	+52	+34	−8	+15	....	......
SOUTH																	
Va.	4,828	10,902	17,942	3,638	15,989	9,074	44,528	38,672	42,535	59,978	100,344	14,798	175,677	145,016	**320,693**	313,380	+4
W. Va.	86	2,326	2,953	417	6,460	......	12,291	6,960	679	42,895	1,300	8,063	59,173	24,578	**83,751**	142,815	−40
N. C.	6,048	4,680	10,494	614	31,133	4,504	18,248	12,963	14,138	23,560	900	11,221	38,721	85,644	**124,365**	185,903	−32
S. C.	1,802	1,118	2,950	571	13,361	1,329	23,513	14,229	6,089	18,271	2,550	5,539	30,738	54,495	**85,233**	129,056	−33
Ga.	4,767	2,868	21,006	1,783	36,809	11,909	62,249	13,724	20,565	24,911	20,963	22,388	70,272	153,105	**223,377**	301,926	−25
Fla.	4,898	11,701	12,410	4,789	61,385	2,635	34,954	56,637	48,955	29,164	95,416	22,767	151,824	184,932	**336,756**	411,494	−17
Ala.	2,033	3,980	8,576	1,401	24,890	960	24,604	15,944	28,831	12,188	10,640	8,508	35,155	78,569	**113,724**	186,392	−38
Miss.	1,756	2,187	496	2,516	22,722	433	8,707	15,881	7,644	3,762	1,100	7,652	25,078	42,134	**67,212**	97,661	−30
La.	5,441	2,504	35,268	9,767	24,675	......	26,447	49,520	30,828	22,541	14,922	12,526	69,367	134,244	**203,611**	272,649	−24
Ky.	4,858	1,699	9,336	11,066	49,651	4,726	25,409	11,940	26,934	35,583	13,349	10,141	60,359	117,399	**177,758**	176,977	+2
Tenn.	4,386	9,336	3,290	15,744	27,383	4,922	34,313	18,308	36,131	11,454	15,693	11,075	55,561	100,343	**155,904**	304,636	−48
1954	**40,903**	**53,301**	**124,721**	**52,306**	**314,458**	**40,492**	**315,263**	**254,778**	**263,329**	**284,307**	**277,177**	**134,678**	**771,925**	**1,120,459**	**1,892,384**	....	−24
1933	52,845	78,746	88,846	35,683	296,380	106,982	395,844	409,707	316,073	362,904	499,524	195,428	1,289,385	1,233,504	....	2,522,889	......
% Change	−21	−31	+43	+49	+8	−61	−19	−36	−15	−20	−43	−30	−39	−7	−24	....	......
MIDDLE WEST																	
Ohio	21,554	24,172	14,765	1,945	137,319	5,395	51,413	20,367	8,658	134,887	213,170	97,552	456,063	266,476	**722,539**	1,217,101	−39
Ind.	2,034	19,839	8,782	307	87,041	5,136	28,502	15,224	12,669	74,992	133,089	27,138	236,412	165,672	**402,084**	538,055	−24
Ill.	8,250	15,228	30,331	5,357	81,934	8,815	61,746	38,720	35,043	82,036	372,243	72,438	532,213	244,885	**777,098**	802,128	−1
Wis.	997	11,042	3,617	376	32,107	3,684	41,449	3,956	9,999	52,284	11,908	65,237	131,727	94,930	**226,657**	162,472	+42
Mich.	6,006	13,754	17,468	2,203	44,661	10,054	101,465	13,480	11,673	98,670	313,805	44,613	458,812	207,367	**666,179**	672,626	+1
1954	**38,841**	**84,035**	**74,963**	**10,188**	**383,062**	**33,084**	**284,575**	**91,747**	**78,042**	**442,869**	**1,044,215**	**306,978**	**1,815,227**	**979,330**	**2,794,557**	....	−16
1953	37,178	85,007	276,320	6,145	277,911	60,073	260,053	182,079	84,775	1,036,370	913,032	258,214	2,323,873	1,068,509	....	3,392,382	......
% Change	+7	+0.7	−72	+69	+40	−44	+12	−49	−6	−56	+17	+21	−20	−7	−16	....	......
WEST OF MISSISSIPPI																	
Minn.	2,378	8,876	3,705	2,266	41,065	555	34,607	40,575	7,329	55,907	4,603	26,900	123,098	98,339	**221,437**	503,542	−55
Iowa	1,045	5,414	13,399	10,321	41,361	906	9,403	5,526	10,980	12,682	4,444	8,690	29,324	83,867	**113,191**	97,074	+19
Mo.	10,777	7,826	15,244	18,807	35,066	12,912	36,693	31,141	33,417	49,935	108,834	79,287	250,126	156,396	**406,522**	356,639	+16
Ark.	562	2,604	1,606	17,040	17,117	329	4,661	30,895	43,861	6,798	5,350	5,718	21,268	71,412	**92,680**	73,944	+28
N. D.	1,628	543	1,692	965	11,764	......	1,852	20,720	5,206	224	....	2,453	19,650	22,191	**41,841**	102,394	−58
S. D.	85	620	3,276	12,561	13,622	......	2,005	25,774	21,307	1,580	487	444	19,937	39,517	**59,454**	72,040	−16
Neb.	5,257	1,337	2,790	5,808	17,624	......	15,383	25,378	22,927	13,256	5,062	7,446	32,069	68,272	**100,341**	118,729	−14
Kan.	9,709	6,409	9,082	6,492	29,806	3,915	30,427	48,582	35,869	20,181	53,658	14,207	109,018	123,450	**232,488**	164,316	+44
Okla.	5,270	1,900	5,995	2,696	32,066	2,499	8,312	31,088	20,964	44,583	31,804	7,148	95,442	77,919	**173,361**	167,674	+5
Tex.	36,366	38,683	14,995	15,705	122,194	22,444	119,960	231,192	123,160	271,557	524,027	110,192	1,049,280	458,035	**1,507,315**	1,504,399	+2
Mont.	1,504	233	923	961	15,226	2,511	4,632	11,334	5,921	....	500	2,216	11,010	29,030	**40.040**	58,622	−30
Wyo.	404	249	583	7,229	8,762	......	6,903	28,115	9,408	6,690	320	327	34,271	25,311	**59,582**	30,665	+98
Colo.	8,640	530	328	1,087	15,069	6,187	22,171	41,858	5,862	7,402	161,925	33,177	241,929	56,445	**298,374**	95,124	+220
N. M.	441	......	1,873	3,066	19,365	2,281	15,125	38,827	30,147	1,220	3,260	2,872	32,176	56,154	**88,330**	94,021	−4
1954	**84,066**	**75,224**	**75,491**	**105,004**	**420,107**	**54,539**	**312,134**	**611,005**	**376,358**	**492,015**	**904,274**	**301,077**	**2,068,598**	**1,366,338**	**3,434,936**	....	+2
1953	72,938	85,647	95,297	135,398	354,062	34,591	299,540	562,316	358,396	1,012,598	553,817	232,979	2,172,327	1,266,856	....	3,439,183	
% Change	+18	−10	−19	−21	+21	+61	+6	+11	+7	−50	+66	+32	−3	+8	+2	....	......
FAR WEST																	
Idaho	......	68	2,684	3,220	19,097	......	9,335	27,202	15,993	....	5,393	1,115	30,065	38,049	**68,114**	62,863	+10
Utah	1,088	7,194	1,065	8,645	10,370	811	10,146	28,708	17,062	6,827	430	3,132	33,575	44,841	**78,416**	68,477	+17
Ariz.	180	337	487	3,418	8,729	......	5,045	4,676	12,748	5,277	350	3,225	8,852	22,872	**31,724**	73,688	−56
Nev.	1,810	732	......	174	8,327	......	2,994	5,208	6,363	5,700	7,680	....	13,380	19,245	**32,625**	29,983	+11
Wash.	1,990	3,776	8,952	26,447	33,996	4,346	40,067	72,600	58,956	40,504	44,999	20,151	140,490	157,338	**297,828**	371,955	−18
Ore.	483	1,912	7,489	65,794	28,730	764	15,064	33,442	80,416	3,652	9,742	10,968	50,680	127,360	**178,040**	169,560	+7
Calif.	32,001	45,585	27,277	42,978	118,342	20,093	209,534	62,295	94,779	133,732	265,261	68,555	471,759	553,894	**1,025,653**	1,004,759	+4
1954	**37,552**	**59,604**	**47,954**	**150,676**	**227,591**	**26,014**	**292,185**	**234,131**	**286,317**	**195,692**	**333,855**	**107,146**	**748,801**	**963,599**	**1,712,400**	....	−2
1953	33,249	47,981	95,865	169,687	201,782	26,263	288,814	254,488	425,998	415,840	185,794	61,522	745,421	1,035,684	....	1,781,285	......
% Change	+15	+27	−49	−9	+15	+0.8	+3	−6	−32	−52	+83	+78	+0.4	−5	**−2**	....	......
CANADA																	
1954	**26,492**	**18,182**	**21,215**	**39,871**	**69,162**	**37,273**	**187,375**	**364,473**	**136,750**	**275,947**	**504,950**	**134,192**	**1,214,474**	**464,658**	**1,679,132**	....	**+33**
1953	23,707	20,278	15,408	21,905	63,275	15,379	139,809	187,203	117,163	476,408	209,534	109,451	910,841	371,516	....	1,282,357	......
% Change	+14	−9	+40	+86	+11	+146	+36	+98	+19	−41	+146	+25	+36	+27	**+33**	....	......

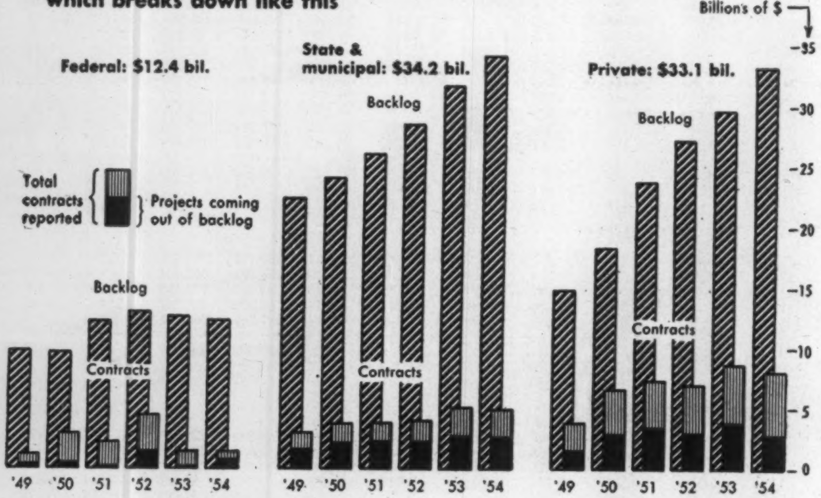
† Incl. private: Bridges, public, $499,394 ('54) $743,350 ('53); private $11,263 ('54) $8,925 ('53) Unclassified, public $879,567 ('54) $805,325 ('53); private $584,998 ('54) $857,169 ('53)

Proposed construction builds up fast in '54—can support high level of contracts in '55 & '56

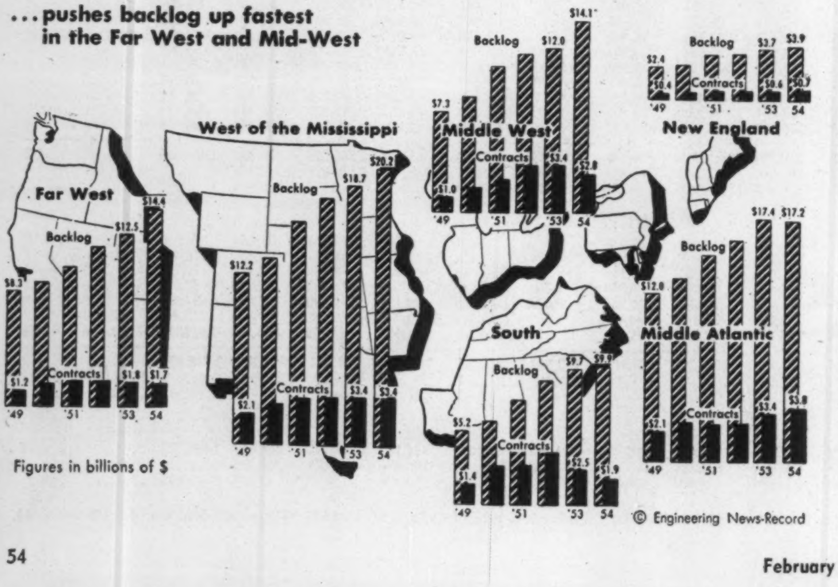
Flow of new proposed projects into the backlog is more than double the flow out to contract



...brings the total backlog to a record $79.7 billion which breaks down like this

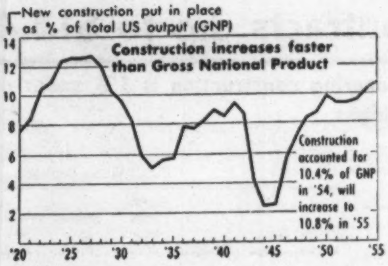


...pushes backlog up fastest in the Far West and Mid-West



Figures in billions of $

© Engineering News-Record



repair, construction spending this year is forecast at $53.5 billion—nearly 15% of total U. S. output in '55.

• Backlog

A major reason for ENR's optimistic outlook for this year is the fast flow of new proposed projects into the ENR backlog. This points to a high level of contract awards for 1955 and 1956. The total volume of projects coming into the backlog was slightly less in 1954 than in 1953—about $15.6 billion, as compared with $16 billion in 1953. But for the first time since ENR began its backlog in 1943, the total volume of proposed projects topped $1 billion in every month of the year.

While projects were coming in, jobs were also moving out of the backlog into the contract stage (top chart at left). But the total was less than half the volume of new proposed work. The result was a $5.6 billion increase in the total backlog during the year to a record $79.7 billion as of Dec. 31.

• **Private work**—The backlog of private work grew fastest in 1954. It rose to a new high of $33.1 billion, up 12%. About $8.2 billion of new private projects was proposed, 3% higher than 1953. This figure is second only to record $10.6 billion, '51's, when defense expansion pushed proposed industrial jobs to a record $6 billion.

• **State and municipal**—Total proposed work in this category was a record $34.2 billion at yearend, pushed up by $6.2 billion in new proposed projects during 1954. Last year was the second highest for this type of proposed work, about 10% below the 1953 peak, when the current flood of turnpike projects first started into the market.

• **Federal backlog**—New proposed work of this type was nearly $1 billion during the year, 8% over 1953. But for the second consecutive year, the total federal backlog declined. It was $12.4 billion at yearend.

• **Regions**—The backlog grew during 1954 in all regions but the Middle

(*Continued on page 58*)

CONSTRUCTION
AND REPAIR

PAINTING AND
PLASTERING

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Shown here are but a few of the hundreds of job applications for ADVANCE — the tubular steel scaffold that goes up faster, without tools . . . stands more rigid . . . provides greater safety . . . dismantles far easier—without lost parts.

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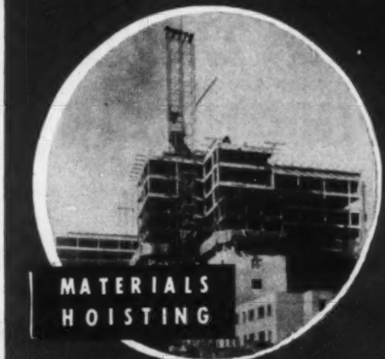
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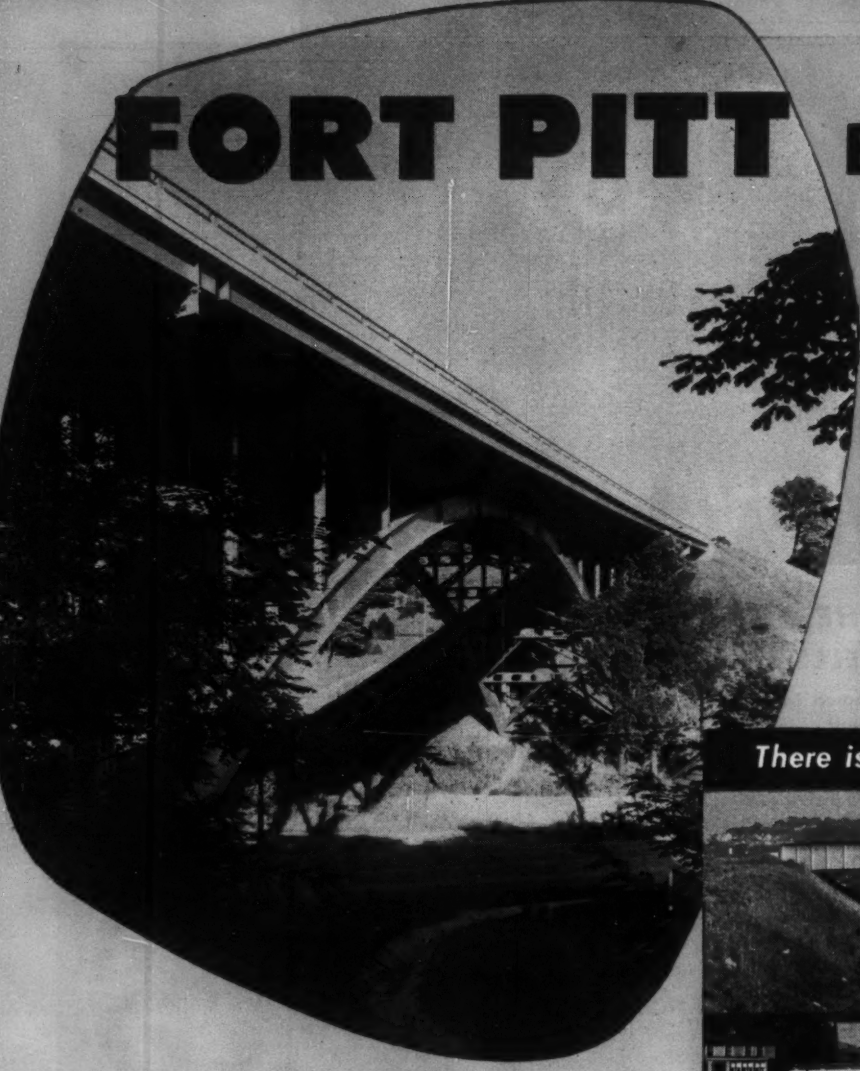
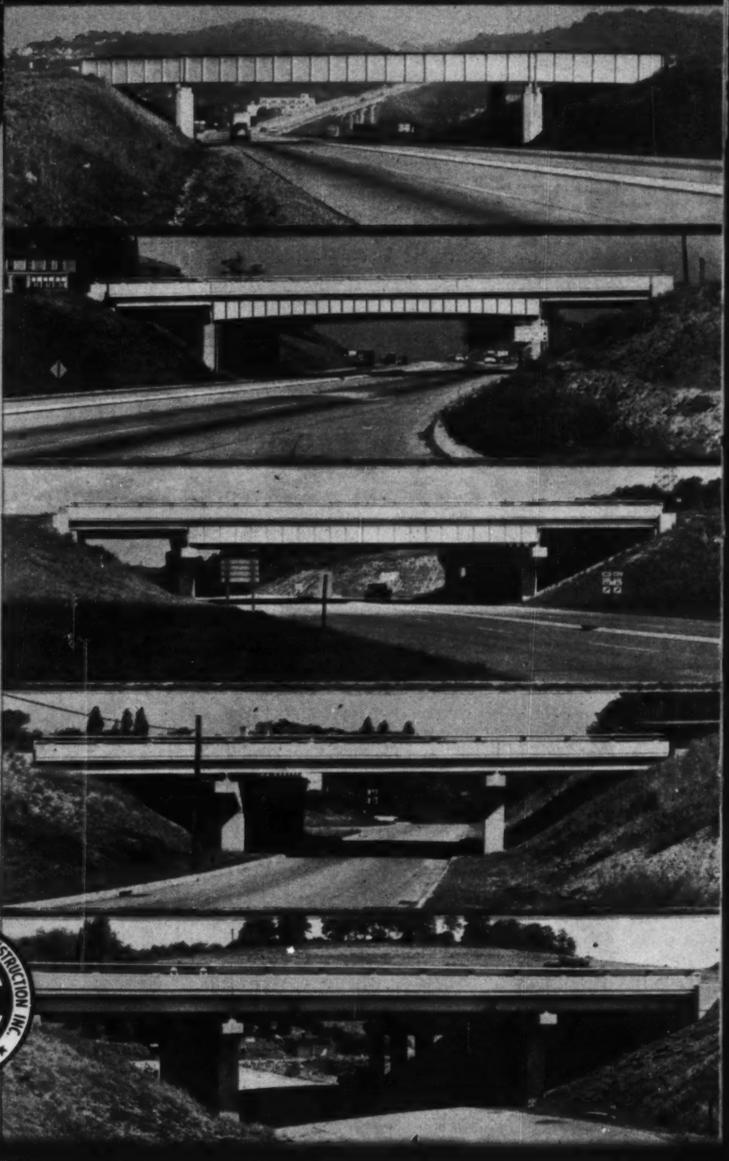
FORT PITT BRIDGES

help speed the traffic on PENNSYLVANIA'S NEW 27-MILE PENN-LINCOLN PARKWAY



There is no substitute for structural steel



The completion of this important new intersection-free, four lane parkway in 1956 will provide a tremendous time and mileage saver for east-west vehicular traffic through downtown Pittsburgh. For twenty-seven miles right through the city, traffic lights will no longer hamper the motorist . . . all entrances and exits will be made by well marked, easy turn-offs and approaches.

Practically all of the bridges required on this modern highway are structural steel—many of them by Fort Pitt Bridge, whose practical experience in the fabrication and erection of bridges of all types dates back to 1896.

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Construction backlog grows to $80 bil.—here's where, by type

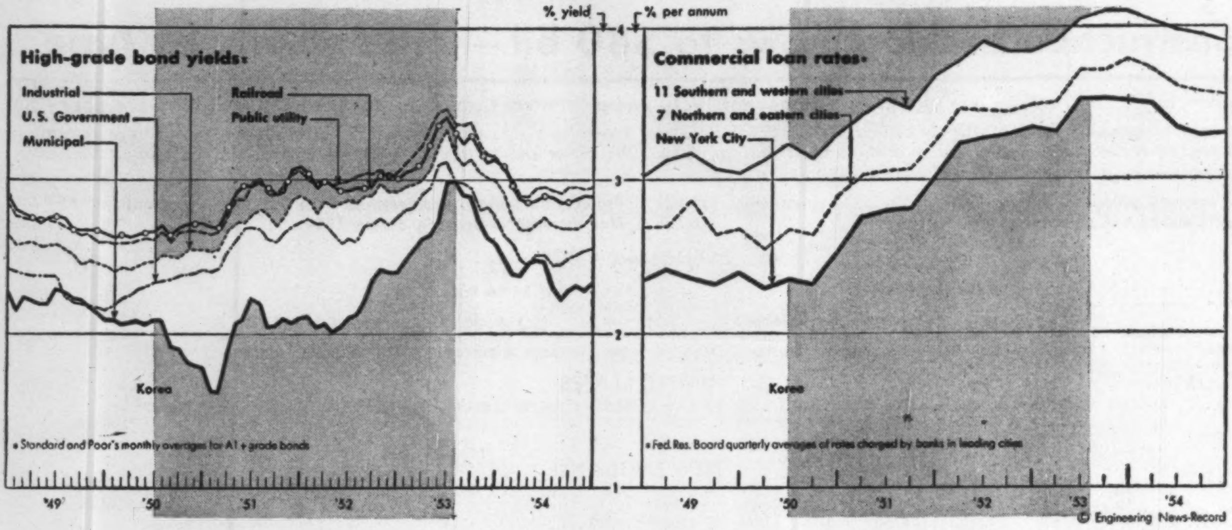
Engineering construction in planning stage, not yet under contract, pushes to record high in December '54

Summary of projects on file with ENGINEERING NEWS-RECORD covering proposed construction estimated to cost these minimum amounts or more: waterworks, excavation and irrigation, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, public and private, $300,000

New projects proposed during 1954	(millions) $15,621		Projects abandoned and removed from backlog	(millions) $3,469
Projects moved out of backlog into contracts	" 6,506		Net increase in backlog during 1954	" 5,646

Thousands of dollars (000 omitted)

	Public Works Projects								Private Projects			Construction				
States	Waterworks	Sewerage	Bridges (includes private)	Earthwork irr.-drain.	Streets and roads	Buildings, incl. public housing	Unclassified	Federal government work	Industrial buildings	Comm'l. buildings & housing	Unclassified	Private	Public	1954 TOTAL	1953 TOTAL	% change '53-'54
UNITED STATES																
1954	1,647,124	2,915,812	2,342,421	9,334,066	8,598,505	15,111,176	6,676,782	12,360,931	11,740,258	12,946,751	8,388,802	33,156,993	46,544,704	79,701,697	....	+8
1953	1,581,620	2,902,418	2,366,424	8,600,505	7,315,090	14,993,989	6,728,339	12,671,275	10,715,810	11,306,341	7,545,531	29,646,101	44,409,966	....	74,056,067	....
% Change	+4	+0.4	−1	+9	+18	+1	−1	−2	+10	+15	+11	+12	+5	+8	....	....
NEW ENGLAND																
Me.	319	5,486	44	1,447	67,116	40,511	71,682	54,077	15,274	23,045	11,240	49,559	186,605	236,164	271,923	−13
N. H.	3,760	4,873	37,369	2,251	7,454	35,625	29,058	19,011	14,499	28,450	10,301	53,250	120,390	173,640	202,489	−14
Vt.	1,464	1,676	1,806	81,376	37,017	17,106	6,050	81,500	3,460	8,850	1,148	13,458	146,495	159,953	163,689	−2
Mass.	29,723	61,625	110,127	36,290	365,645	607,941	200,731	206,386	81,856	254,955	92,813	429,624	1,412,082	1,841,706	1,685,372	+9
R. I.	6,292	39,380	32,566	2,025	69,491	88,496	37,768	69,830	9,261	46,730	26,409	95,900	262,518	358,418	350,336	+2
Conn.	16,556	28,323	45,969	82,334	198,349	328,233	57,780	116,962	113,510	255,920	25,394	395,054	757,314	1,152,368	1,050,789	+10
1954	58,114	141,363	227,881	205,723	745,072	1,117,912	403,069	547,766	237,860	617,950	167,305	1,036,845	2,885,404	3,922,249	....	+5
1953	63,904	146,593	229,183	199,442	662,751	1,120,915	436,346	598,379	214,264	482,736	168,464	879,194	2,845,404	....	3,724,598	....
% Change	−9	−4	−1	+3	+12	−0.3	−8	−8	+11	+28	−1	+18	+1	+5	....	....
MIDDLE ATLANTIC																
N. Y.	243,489	339,243	165,916	557,724	684,505	2,411,963	1,327,940	435,268	392,514	1,806,071	184,081	2,382,992	5,730,454	8,113,446	8,253,487	−2
N. J.	63,381	61 379	110,359	19,971	402,231	409,441	264,917	102,879	379,017	423,939	89,875	892,831	1,331,679	2,224,510	2,398,790	−7
Pa.	63,638	157,659	156,398	218,907	799,753	783,144	374,951	405,766	570,183	844,030	229,766	1,648,028	2,550,401	4,198,429	4,282,703	−2
Md.	30,772	20,010	4,151	58,258	391,064	310,075	220,584	243,185	211,221	186,954	88,635	486,810	1,034,914	1,521,724	1,421,581	+7
D. C.	12,697	5,696	59,365	2,137	13,416	335,657	43,352	304,222	299	231,710	992	233,001	472,320	705,321	687,761	+3
Del.	1,941	9,672	17,319	48,302	42,118	48,715	12,739	64,677	99,584	91,040	36,401	227,025	180,806	407,831	346,405	+18
1954	415,918	593,659	513,508	905,299	2,333,087	4,298,995	2,244,483	1,555,997	1,652,818	3,583,744	629,750	5,870,687	11,300,574	17,171,261	....	−1
1953	419,398	655,521	593,438	876,249	2,317,858	4,513,675	2,277,526	1,708,282	1,541,488	3,581,271	614,303	5,741,437	11,649,290	....	17,390,727	....
% Change	−1	−9	−13	+3	+1	−5	−1	−9	+7	+0.1	+3	+2	−3	−1	....	....
SOUTHERN																
Va.	8,244	75,366	31,102	101,928	148,337	276,622	119,373	285,618	196,007	216,200	116,134	528,341	760,972	1,289,313	1,287,046	+0.2
W. Va.	2,921	39,682	2,122	25,509	26,692	100,060	40,647	62,788	145,470	17,339	17,873	180,857	237,458	418,315	362,005	+16
N. C.	25,205	35,453	8,512	201,693	32,081	223,723	42,202	314,820	198,783	87,612	105,970	392,643	568,591	961,234	949,067	+1
S. C.	17,988	16,070	11,167	94,703	16,198	108,029	129,537	219,948	174,849	64,035	49,031	287,915	393,692	681,607	718,816	−5
Ga.	20,028	30,159	21,518	27,143	55,799	246,884	38,362	68,335	99,204	93,411	77,773	271,138	439,143	710,281	718,825	−1
Fla.	12,717	56,638	51,511	50,496	397,122	181,232	131,957	156,245	183,697	187,050	89,857	461,154	881,123	1,342,277	1,508,400	−11
Ala.	26,526	26,744	8,739	66,260	19,097	273,922	40,860	217,449	116,977	64,931	178,628	360,536	462,148	822,684	762,185	+8
Miss.	10,797	6,824	38,854	27,483	8,094	58,402	33,152	54,003	69,948	36,463	211,360	319,021	182,356	501,377	436,283	+15
La.	21,965	22,559	92,012	94,539	104,762	140,531	85,288	152,185	300,269	63,932	345,310	710,310	560,857	1,271,167	1,189,762	+7
Ky.	14,087	49,218	9,238	38,400	14,053	130,455	7,144	80,496	219,927	88,811	132,990	441,728	262,595	704,323	641,460	+10
Tenn.	13,810	48,784	33,991	77,387	29,288	307,260	84,186	245,059	192,396	214,703	177,214	584,406	594,613	1,179,019	1,130,117	+4
1954	174,288	407,497	308,766	805,541	851,523	2,047,120	752,708	1,856,946	1,897,527	1,134,487	1,502,140	4,538,049	5,343,548	9,881,597	....	+2
1953	189,879	375,997	313,683	808,280	788,270	2,141,755	860,205	1,919,151	1,738,863	1,118,386	1,368,648	4,229,492	5,474,474	....	9,703,966	....
% Change	−8	+8	−2	−0.3	+8	−4	−12	−3	+9	+1	+10	+7	−2	+2	....	....
MIDDLE WEST																
Ohio	108,883	281,447	111,983	91,713	888,179	745,937	191,988	173,828	738,563	709,936	443,650	1,905,865	2,406,414	4,312,279	3,896,811	+11
Ind.	20,073	80,009	78,050	70,692	531,130	251,493	56,609	84,580	756,517	218,400	124,309	1,099,666	1,087,616	2,187,282	1,794,941	+22
Ill.	132,492	165,256	122,431	232,089	901,596	566,326	209,723	210,125	739,740	560,421	219,366	1,528,589	2,320,851	3,849,440	3,247,061	+19
Wis.	11,661	25,170	29,875	46,828	48,272	182,409	34,286	64,894	238,865	141,497	61,881	442,443	378,301	820,744	659,543	+24
Mich.	38,711	214,193	206,134	87,625	367,845	885,622	118,851	211,514	359,648	446,002	196,159	1,001,809	1,918,981	2,920,790	2,428,936	+20
1954	311,820	766,075	548,473	528,947	2,737,022	2,631,787	611,457	744,941	2,833,333	2,076,256	1,045,365	5,978,372	8,112,163	14,090,535	....	+22
1953	279,692	737,550	518,278	351,526	1,927,165	2,467,875	578,829	676,577	2,437,617	1,769,933	958,827	5,190,395	6,836,897	....	11,504,145	....
% Change	+11	+4	+6	+50	+42	+7	+6	+10	+16	+17	+9	+15	+19	+22	....	....
WEST OF MISSISSIPPI																
Minn.	24,647	43,682	26,655	7,435	16,677	153,024	31,407	13,687	106,861	93,230	116,659	318,275	302,002	620,277	629,567	−1
Iowa	5,102	12,213	6,678	66,373	5,664	73,811	7,695	60,531	26,564	40,607	156,349	224,700	176,356	401,056	432,610	−7
Mo.	32,522	76 504	59,987	199,339	307,772	419,890	90,619	396,416	834,728	343,685	265,562	1,446,524	1,184,084	2,630,608	2,422,474	+9
Ark.	19,857	24,759	27,990	286,831	16,656	103,626	56,337	312,768	305,904	63,061	203,722	572,902	535,841	1,108,743	1,090,992	+2
N. D.	4,676	3,135	143	149,456	....	13,673	3,833	149,965	11,835	8,732	45,436	66,003	174,916	240,919	228,285	+6
S. D.	3,134	1,781	480	140,522	4,455	8,060	11,311	141,342	6,040	6,725	39,724	52,489	169,743	222,232	257,606	−14
Neb.	6,691	34,576	14,535	141,651	15,290	150,246	53,797	176,202	50,058	51,752	89,911	193,174	415,333	608,507	586,663	+4
Kan.	20,825	69,157	13,017	213,117	169,953	216,111	50,079	317,436	231,667	74,471	236,123	542,261	752,259	1,234,520	1,218,069	+6
Okla.	33,015	20,442	15,437	276,176	54,735	144,817	100,798	334,206	122,435	75,854	168,777	367,555	644,931	1,012,486	1,007,956	+0.4
Tex.	317,811	238,559	125,723	1,007,519	178,284	1,185,066	822,160	1,247,212	2,313,899	1,893,267	1,348,462	5,581,118	3,849,632	9,430,750	8,635,203	+9
Mont.	6,621	3,831	62,636	320,984	10,293	44,542	22,020	331,890	21,233	14,553	101,313	137,099	470,927	608,026	512,117	+19
Wyo.	4,945	2,948	547	182,683	....	20,020	10,546	193,112	50,702	11,698	81,004	143,404	221,689	365,093	354,708	+3
Colo.	39,919	13,535	6,614	321,657	80,487	135,986	171,557	515,685	61,840	161,257	171,973	395,070	769,755	1,164,825	894,017	+30
N. M.	2,168	4,105	1,497	45,954	2,177	74,203	46,566	108,970	93,430	31,006	183,195	307,681	176,620	484,301	464,572	+4
1954	521,933	549,227	361,939	3,359,697	862,443	2,743,075	1,478,725	4,299,422	4,237,196	2,869,898	3,208,210	10,348,255	9,844,088	20,192,343	....	+8
1953	485,290	557,214	351,219	3,313,841	782,340	2,690,729	1,421,438	4,368,985	3,863,313	2,259,558	3,009,897	9,163,956	9,570,883	....	18,734,839	....
% Change	+8	−1	+3	+1	+10	+2	+4	−2	+10	+27	+7	+13	+3	+8	....	....
FAR WEST																
Idaho	3,033	6,327	7,611	114,979	23,225	72,965	21,599	160,470	13,228	10,309	513,519	538,356	248,439	786,795	480,817	+64
Utah	19,768	21,551	4,024	128,556	18,688	51,910	22,000	140,798	49,830	65,709	118,317	233,856	266,497	500,353	419,455	+19
Ariz.	5,087	5,466	....	574,957	20,793	21,993	62,042	623,819	67,602	59,816	153,815	281,233	690,338	971,571	939,372	+3
Nev.	8,849	1,737	4,453	35,988	4,179	22,016	12,597	21,764	18,602	23,820	43,988	86,410	89,819	176,229	176,138	+0.1
Wash.	60,797	58,185	167,408	1,442,129	408,577	635,985	249,630	1,270,947	91,603	216,373	216,285	524,901	3,022,071	3,546,972	2,960,414	+20
Ore.	5,831	13,948	34,901	184,445	34,463	77,238	24,266	212,593	131,783	71,506	165,489	368,778	375,092	743,870	610,075	+22
Calif.	61,686	350,777	163,457	1,047,805	559,433	1,390,180	794,206	925,468	508,876	2,216,883	624,619	3,351,251	4,366,671	7,717,922	6,888,374	+12
1954	165,051	457,991	381,854	3,528,859	1,069,358	2,272,287	1,186,340	3,355,859	881,524	2,664,416	1,836,032	5,384,785	9,058,927	14,443,712	....	+16
1953	143,457	429,543	360,623	3,051,167	836,706	2,059,040	1,153,995	3,399,901	920,265	2,094,457	1,425,392	4,441,627	8,033,018	....	12,474,645	....
% Change	+15	+7	+6	+16	+28	+10	+3	−1	−4	+27	+29	+21	+13	+16	....	......
CANADA																
1954	197,218	233,067	167,173	871,280	1,450,221	1,663,285	1,295,346	876,288	1,653,467	1,852,412	1,654,480	5,161,933	5,876,016	11,037,949	....	+2
1953	186,952	264,145	351,789	704,130	1,467,830	1,722,056	1,253,723	660,974	1,637,868	1,722,682	1,468,897	4,831,221	5,948,851	....	10,780,072	....
% Change	+5	−12	−52	+24	−1	−3	+3	+33	+1	+8	+13	+7	−1	+2	....	....



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Atlantic, where it dipped slightly below its peak (see bottom chart, page 54). The fastest growth came in the Middle West and Far West. The West-of-Mississippi backlog also increased substantially. Its $20.2 billion total is ahead of all other regions. Small increases in the backlog came in New England and the South.

• Financing

State and local financing for new construction reached another record in 1954. The total, as computed by ENR, was over $5.9 billion (table, below). This is 20% above 1953, which was itself a record year.

About one-third of the $900-million gain over 1953 was in the field of highways. Much of the total volume of highway financing ($1,740 million) was for turnpikes. There was another substantial gain in financing for earthwork and waterways. But the big gain was in the unclassified category, where king-sized bond issues for the St. Lawrence power project and Maryland's Patapsco Tunnel did much to boost the total.

One of the biggest categories of municipal financing in 1954 was for schools. The total here was $1.6 billion, up 9% from the previous year.

In contrast to municipal financing, corporate financing fell off 39% below the 1953 record, in line with a 38% decline in heavy industrial contracts (ENR's industrial awards, plus private unclassified awards). Corporate financing totaled $2.6 billion last year.

For much of the year, the cost of borrowing drifted gently downward (charts, above). Toward the end of the year, the cost of borrowing began to rise once more. Part of this was due to the huge volume of borrowing in the municipal-bond market and in the mortgage market, which competes with the bond market. In December, the Federal Reserve Board showed signs of tightening credit slightly. And the Treasury has entered the long-term market for the first time in nearly two years. This means interest rates will probably continue to rise.

• Materials

The high rate of new construction last year set all sorts of records in manufacturers' shipments of materials. New records were made in fabricated structural steel, portland cement, aluminum extruded shapes and tubing, Douglas fir plywood, vitrified clay sewer pipe, and new hardwood flooring (table, below).

Fabricated structural steel shipments hit a new high of more than 3.1 million tons, 0.6% above the 1953 record. But, according to the American Institute of Steel Construction, new bookings declined to 2.5 million, 10% below the 1953 level.

Shipments of concrete reinforcing bars dipped 5% to nearly 1.8 million tons during 1954, according to American Iron & Steel Institute. Shipments got off to a slow start, running 22% behind 1953 during the first four months. In May, they started to pick up and topped year-ago shipments in every month except September, October and December.

Plywood had a record year, in spite of the strike. Shipments in 1954 topped 3.8 billion sq. ft. (on ⅜-in. thickness basis). That is up 4.2% over the previous high in 1953, according to the Douglas Fir Plywood Association. New orders came in fast during 1954, particularly during the last quarter. The order backlog rose from 300 million sq. ft. to 519 million during the year. This surge in plywood is due largely to the boom in home construction.

Total lumber shipments were close to 37 billion bd ft last year—about 4% behind 1953. Though shipments were lower than in 1953 for each of

State & municipal financing breaks record in '54

Bond sales for new construction money, in millions of dollars

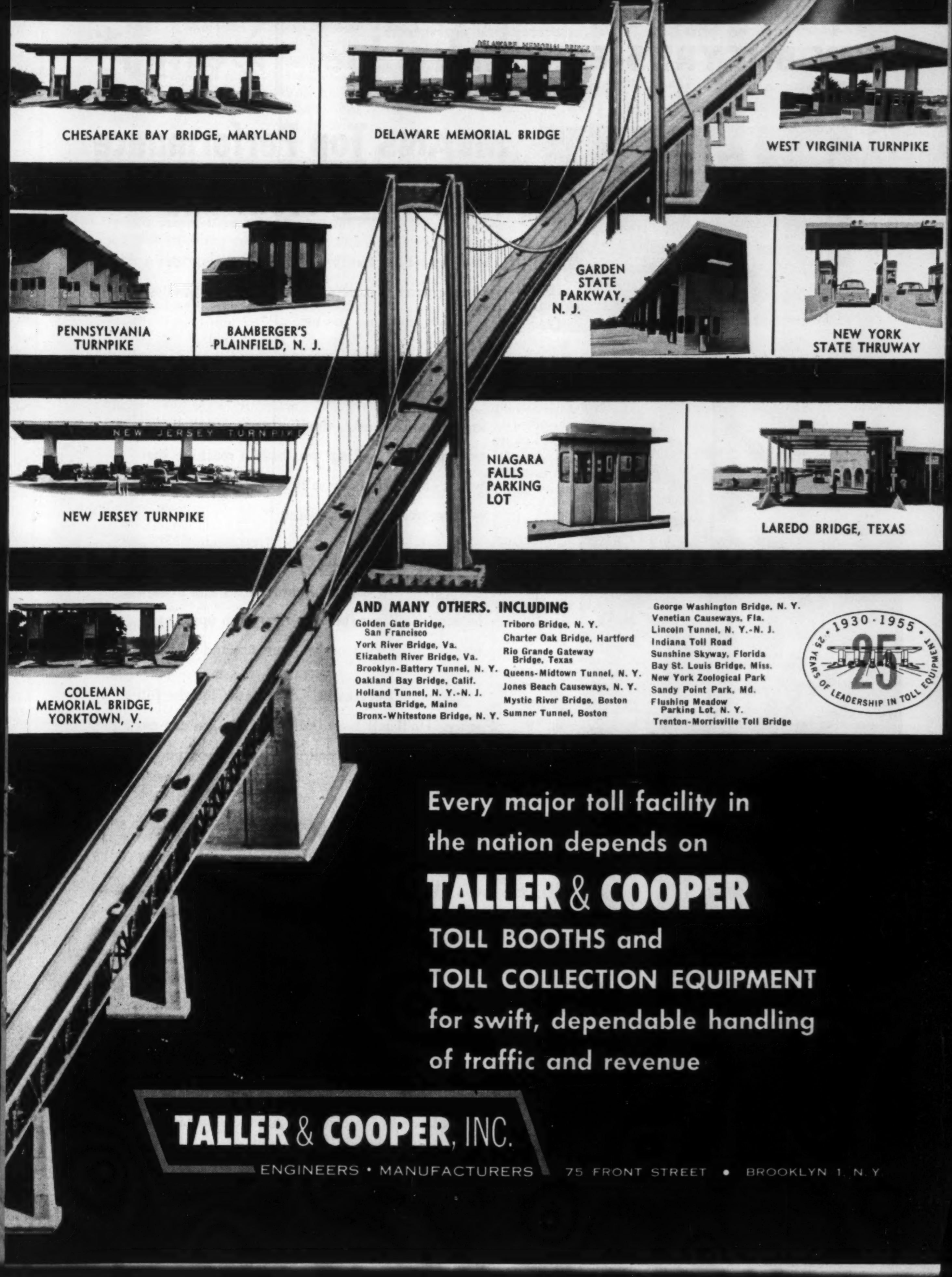
	1952 52 weeks	1953 53 weeks	1954 52 weeks	% change 53-54 based on av. wk
All construction	$3,473.9	$5,031.1	$5,931.5	+20
Buildings	1,593.4	2,114.8	2,018.9	−3
Schools	1,088.2	1,497.9	1,600.4	+9
Housing	317.3	283.1	112.4	−60
Other buildings	187.9	333.8	306.1	−7
Heavy construction	1,844.5	2,916.3	3,912.6	+37
Highways	843.7	1,393.5	1,740.0	+27
Bridges	83.0	346.5	309.8	−9
Sewerage	228.0	421.5	382.4	−8
Waterworks	217.2	326.9	376.2	+17
Earthwork, irrigation & waterways	21.4	31.5	126.8	+310
Unclassified	451.2	396.4	977.4	+151

Materials shipments set new highs in 1954

Portland cement, fir plywood, fabricated structural steel and vitrified clay sewer pipe reach new all-time highs; but shipments of reinforcing bars, lumber and brick dip below '53

	Units in Mill'ons	1952	1953	1954*	% chg '53–'54
Alum wrought products‡	lbs	1,924	2,287	2,073	−9
Cement, U. S. Bu Mines	bbl	251.137	260.888	275.000	+5
Fabr struct steel, AISC	tons	2.664	3.118	3.136†	+1
Reinf steel, AISI	tons	1.813	1,849	1,751†	−5
Unglazed brick‡		5,635	5,771	6,150	+7
Vit clay sewer pipe‡	short tons	1,545	1,563	1,613	+3
Unglazed str tile‡	short tons	0.920	0.922	0.891	−3
Lumber, NLMA	bf	38,205	38,510	36,998†	−4
Softwood	bf	30,578	30,318	30,281†	−0.1
Hardwood	bf	7,627	8,192	6,714†	−18
Douglas fir plywood, DFPA Production	sf on ⅜″ basis	3,050	3,670	3,824†	+4

*** ENR—estimates based on 11-mo figures.** **‡ U. S. Bu of Census.** **† Final, 12-mo.**


CHESAPEAKE BAY BRIDGE, MARYLAND
DELAWARE MEMORIAL BRIDGE
WEST VIRGINIA TURNPIKE
PENNSYLVANIA TURNPIKE
BAMBERGER'S PLAINFIELD, N. J.
GARDEN STATE PARKWAY, N. J.
NEW YORK STATE THRUWAY
NEW JERSEY TURNPIKE
NIAGARA FALLS PARKING LOT
LAREDO BRIDGE, TEXAS
COLEMAN MEMORIAL BRIDGE, YORKTOWN, V.
1930 · 1955
25 YEARS OF LEADERSHIP IN TOLL EQUIPMENT

AND MANY OTHERS. INCLUDING

Golden Gate Bridge, San Francisco
York River Bridge, Va.
Elizabeth River Bridge, Va.
Brooklyn-Battery Tunnel, N. Y.
Oakland Bay Bridge, Calif.
Holland Tunnel, N. Y.-N. J.
Augusta Bridge, Maine
Bronx-Whitestone Bridge, N. Y.
Triboro Bridge, N. Y.
Charter Oak Bridge, Hartford
Rio Grande Gateway Bridge, Texas
Queens-Midtown Tunnel, N. Y.
Jones Beach Causeways, N. Y.
Mystic River Bridge, Boston
Sumner Tunnel, Boston
George Washington Bridge, N. Y.
Venetian Causeways, Fla.
Lincoln Tunnel, N. Y.-N. J.
Indiana Toll Road
Sunshine Skyway, Florida
Bay St. Louis Bridge, Miss.
New York Zoological Park
Sandy Point Park, Md.
Flushing Meadow Parking Lot, N. Y.
Trenton-Morrisville Toll Bridge

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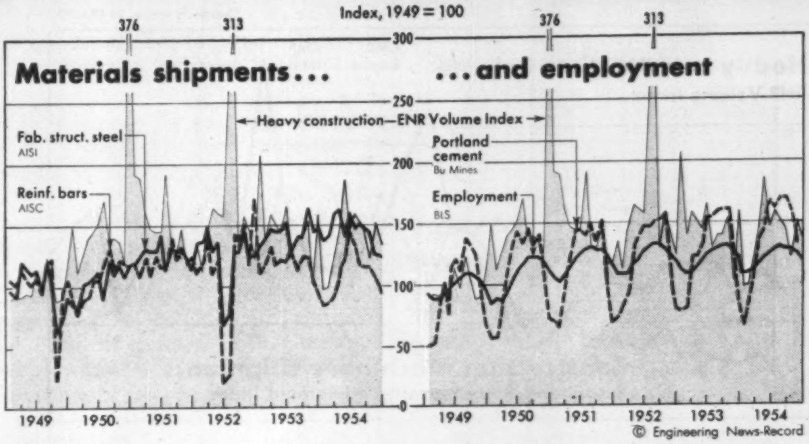
means that each model is built from the ground up to handle a specific load most efficiently. There are no oversize or undersize dippers, no overpowering, no compromise in stress or safety limits simply to create "new" models. Each part is properly designed to coordinate its function with the whole machine for the greatest efficiency at the rated load.



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the first nine months they topped '53 during the last quarter.

Most of the 1954 decline came in hardwoods. But hardwood flooring bucked the trend. Mill shipments of softwood lumber trailed '53 by 4% at the end of August, according to the National Lumber Mfgrs. Assn. But they topped year-ago levels from September on, ending up '54 very close to 1953's 30.3 billion bd-ft.

Shipments of aluminum wrought products were off 11% from 1953 in the first 11 months. However, extruded shapes, tube blooms, and tubing will set a new postwar record this year. Eleven-months shipments were 9% ahead of the 1953 record. By contrast, rolled structural shapes, rods, bars, and wire were down 17% during the first 11 months.

Cement manufacturers had their biggest year in 1954, as they pushed to expand capacity. Total production was over 270 million bbl., 2.5% above the previous high. Shipments, at 275 million bbl., were up 5% to a new record.

• Employment

The number of workers employed in contract construction dipped 6.6% below 1953's record level. (These employment figures come from a new series issued by the Bureau of Labor Statistics.) Preliminary BLS estimates put average employment in contract construction at 2,627,000 during 1954.

During the spring and summer, the total number of contract workers ran about 1% above the same 1953 period. But in September employment began to slide, as compared with the same month of the previous year. This downtrend continued through December, when employment was 3.2% below the record set in December 1953. The total was 2,547,000, which was also slightly below the December 1951 and 1952 levels.

This decline was entirely in building employment. For all of last year, building employment averaged 1% below 1953. Nonbuilding employment was up 2.1%, reflecting the substantial increase in highway construction.

• The employment paradox—While building employment was declining in 1954, the value of total new construction put in place was up 5.4% over 1953, as estimated by BLS and the Dept. of Commerce.

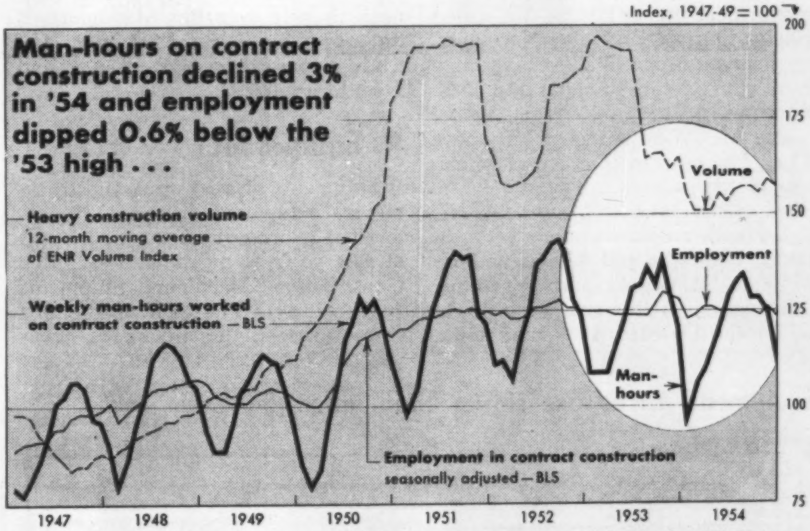
Much of this contradiction may be explained by dollar inflation. However, if you express the dollar value of work in place in constant 1947-1949 dollars, by using the Dept. of Commerce Composite Construction Index, the increase in 1954 over 1953 still comes out 5.3% in terms of physical volume. If you use ENR's Construction Cost and Building Cost Indexes, the increase in physical volume comes down to only 0.5%.

Part of the explanation may be this: Contractors are bidding closely, and so are cutting their costs wherever possible. Inefficient workers have been weeded out and over-all productivity has increased, so that contractors are now getting more work out of fewer workers.

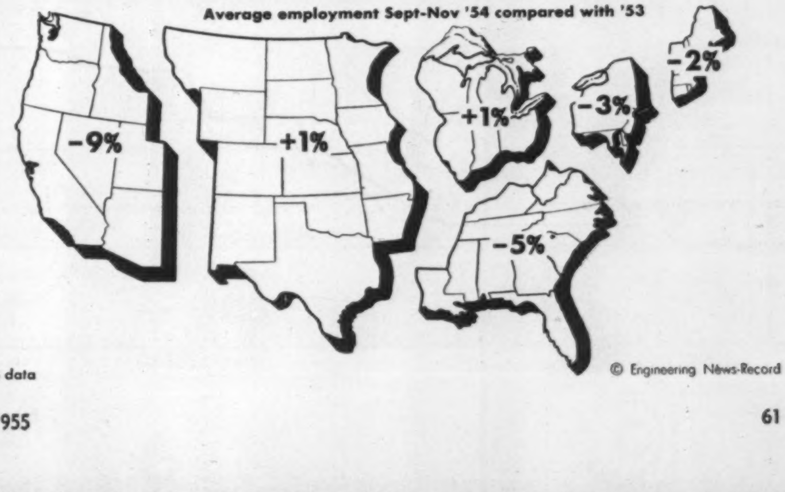
But at the same time, costs of some types of construction, particularly in the building line, have crept upwards because of higher materials prices and labor rates. Because of this, part of the increase in dollar value of work put in place last year was due to cost inflation.

• Weekly man-hours—Weekly man-hours on contract construction also declined in 1954, continuing a trend that began in 1953 when tight bidding forced cutbacks in overtime.

(*Continued on page 62*)



. . . while contract construction employment late in '54 ran below 1953's record. The trend varied by regions . . .



BLS data

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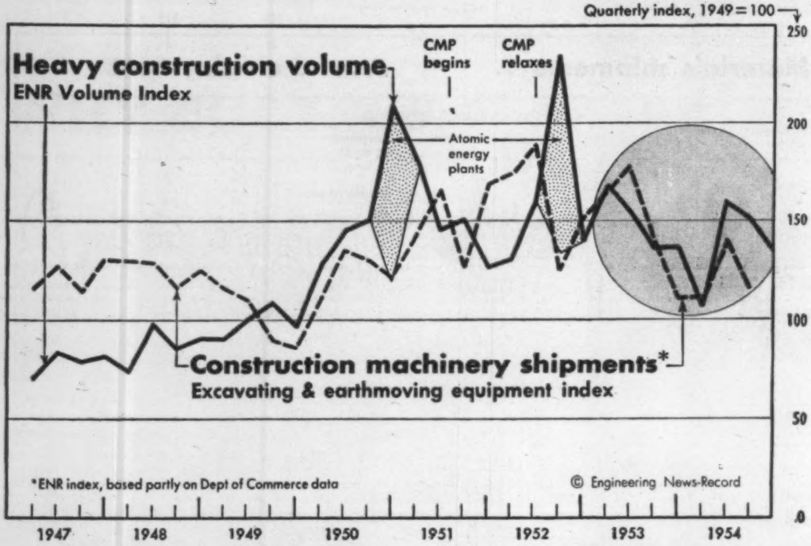


The BLS index of weekly man-hours in '54 averaged 3% below '53. The December '54 index was 6% under a year ago. (Lower chart, page 61.) That's a much sharper drop than in total contract employment. In addition to cutbacks in overtime, the decline in the work week during 1954 may also indicate that some contractors had to lay people off temporarily.

Regionally, the contract construction employment trend late in '54 varied widely. During September-November, employment averaged above a year ago in only 17 of the 46 states and D.C. reporting to BLS.

The Mid-West averaged 1% above '53 as 2% gains in Illinois and Michigan offset Indiana's 2% dip. The West of the Mississippi was also 1% higher with employment up 5-9% in Texas, Nebraska and Kansas and up 1-2% in Minnesota and Wyoming. Other states in this area were down, led by the Dakotas, 13%, and Iowa, 11%.

In contrast, Far West employment was off 9% due to 10-12% drops in California, Idaho and Arizona and a 7% decline in Oregon. Despite a 16% rise in Tennessee and 4% gains in Alabama and Virginia, the South declined 5%. Sharp drops were in So. Carolina, 24%; Louisiana, 20%; Mississippi, 18%; and W. Virginia, 15%.

New England and the Mid-Atlantic dipped 2% and 3%, respectively. Connecticut held even but Massachusetts dropped 5%. New York rose 4% while Pennsylvania was off 4% and New Jersey 1%.

• Equipment

Shipments of excavating and earthmoving equipment dropped 24% below 1953 during the first nine months of last year, as measured by ENR's Construction Machinery Shipments Index (chart). For each of the first three quarters, the index was below the previous year. However, the gap narrowed from 33% in the first quarter to 16% in the third.

There are signs that shipments did better during the last three months of 1953. The upturn in heavy construction contracts that started back in the second quarter of 1954 is now being reflected in better business for manufacturers. Awards and equipment shipments have moved closely together since 1949. What's more, the faster write-offs on new equipment allowed by the 1954 tax revision are expected to stimulate sales on new equipment.

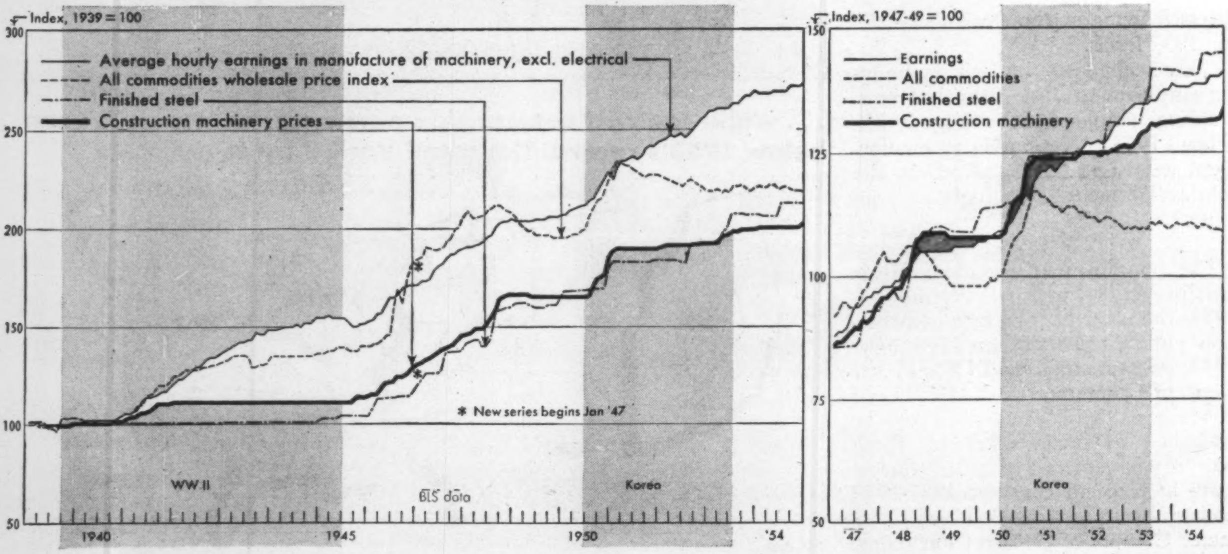
Equipment prices ended 11 months of stability in December '54 as the BLS index of manufacturers' prices climbed to 133.9 (1947-49 = 100), 2.1% above a year ago. However, this was less than 1953's 3.8% rise.

• Squeeze continues—Higher labor and steel costs partly offset the 2.1% rise in equipment prices last year. December average hourly earnings in nonelectrical machinery were 1.5% above December '53 and the price of finished steel was up 2.3%. Because of this, equipment makers remained in a tight cost-price squeeze.

Since price controls went into effect in February 1951, equipment prices have increased 8.3% as measured by the BLS wholesale price index. In the same period, BLS figures show a 17.5% gain in average hourly earnings of workers in non-electrical machinery and a 16.3% boost in finished steel.

Price increases in '54 varied according to type of equipment. Biggest increase was in power cranes, up 2.7%. However, this was less than the 4.7% rise in '53. Tractor prices moved up 1.2% last year, much less than the 6.3% climb during 1953. Prices of portable compressors and machinery for mounting on tractors were stable in '54 rising 0.6% and 0.5%.

Equipment prices rise slower than labor and steel costs



• Costs

Construction costs will keep on going up in 1955. ENR's Construction Cost Index can be expected to rise about 4%, to around 667 by next December. The Building Cost Index will also probably increase about 4%, to around 475 by the end of the year.

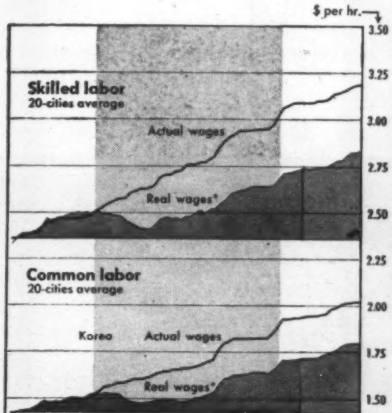
These projected increases would be smaller than those in 1954—even though they allow for increases in all three major construction materials—structural steel, portland cement, and lumber. They also allow for increases in wages of both common and skilled labor.

Judging by forecasts of contract awards and of work put in place, demand for materials should be heavy. This will be particularly true of lumber and cement. The forecast for ENR's 20-cities average of fir and pine 2x4's is a 5.5% rise. Cement is expected to rise 3.8% during the year. The steelworkers' contract will be open for wage negotiations this year; guesstimates are that increases could send mill prices of steel up $4 per ton. That would mean a 4.7% increase in structural steel.

Construction wages are expected to continue rising, but the rate of increase is expected to taper off. Common-labor rates may rise 3%; skilled-labor rates may also climb 3%. However, tight competition and narrow profit margins may force hard-pressed contractors to put up more resistance than ever to new wage demands.

Factors which may restrain union wage demands in '55 are the decline in employment on contract construction, which dropped below year-ago levels in the last four months of '54, and the stable cost of living which allowed real earnings to keep pace with actual gains in '54.

Evidence already in from scattered points in the nation indicates that unions are settling for smaller increases than they won last year.



• 1954 review—Largely because of the long strike at lumber mills in the Pacific Northwest, construction costs rose sharply in 1954. The strike boosted fir prices by 14.1%, and affected pine prices, which rose 3.5% during the year, according to ENR's 20-cities average. Structural steel prices rose 3.7% at the mill, and portland cement climbed 3.6%. Common-labor wages were up 4.6%; skilled-labor wages rose 3.4%.

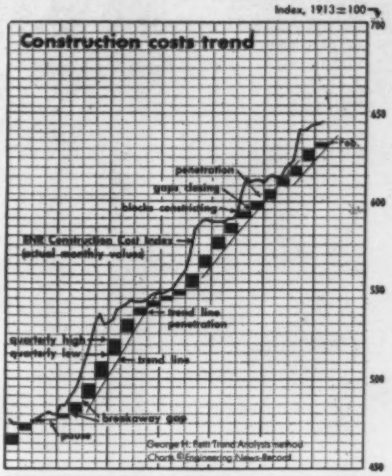
The result was to push the ENR Construction Cost Index up 5.2% to a record high, compared with 3.9% in 1953. The Building Cost Index also rose to a new high, with a 4.9% gain for the year. This was nearly double the 2.5% rise in 1953.

ENR had forecast a rise of about 2% for the two indexes. It was fairly close on estimates of how much cement prices and wage rates would rise, but way off on lumber (the long strike), and steel (a general price increase that was not generally expected).

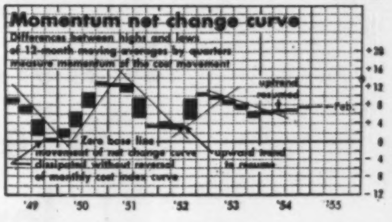
• Contractor squeeze tightens—Bid prices on highway contracts dropped further in 1954. For instance, bid prices for state highway jobs in California were 11.3% lower in the fourth quarter than in the same 1953 period. In Texas, they dropped 3.2%. They dropped 5% for the year in Colorado, though prices firmed up in the last quarter to only 4% under the '53 average. The Bureau of Public Roads' Composite Mile Bid Price Index for federal-aid highways was down 5.4% in the third quarter compared with a year earlier.

This widening spread between the prices highway contractors got for their work, and the 5% or so increase in costs as measured by the ENR indexes suggests what competition is doing to their profit margins.

A similar situation, though not as dramatic, is indicated in the building field. While contractor building price indexes tended to rise in 1954, these increases fell short of the wage-price trend.



George H. Fett Trend Analysis method
Charts ©Engineering News-Record



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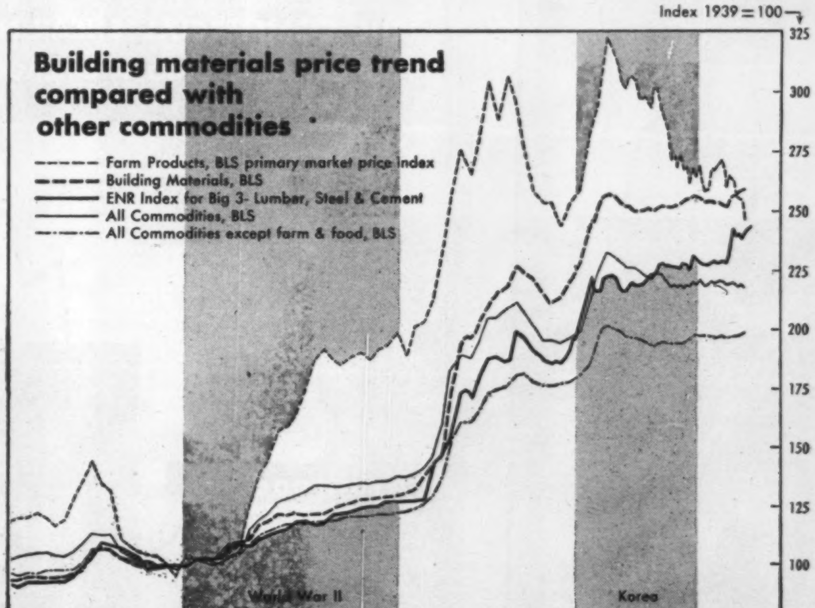

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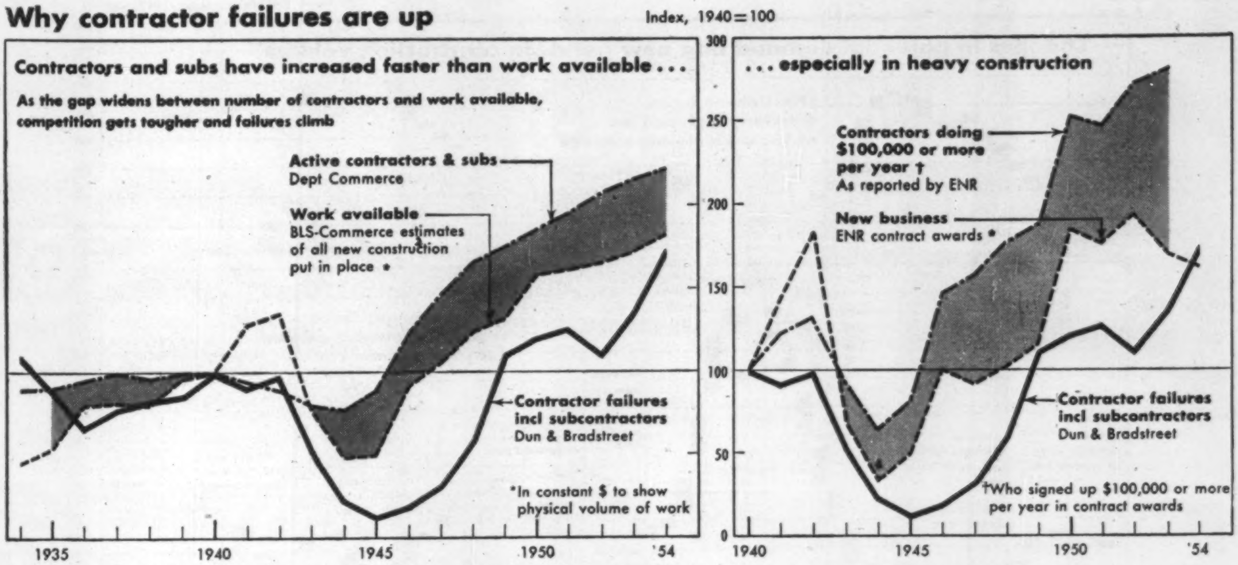


Why contractor failures are up

For instance, the Aberthaw and Austin price indexes rose 1% and 1.6% respectively last year—much less than the 4.9% increase in the ENR Building Cost Index. The Fuller Index climbed 4.1%. However, the Turner Index dropped 2.9% between October 1953 and April 1954, then levelled off for the rest of the year.

The E. H. Boeckh weighted index of commercial and factory building costs, including contractor's overhead and profit, edged up only 0.7% during 1954. The Smith, Hinchman & Grylls weighted cost index, which adjusts for estimated productivity, rose 1.9% last year.

- **Failures hit record**—Contractor failures last year climbed 27% to a total of 1,305. That's the largest number of firms to go under in any year since 1934, when Dun & Bradstreet started keeping record. The companies that failed in 1954 had total liabilities of $56.8 million, also a record, and 31% above the 1953 total.

The figures showed that building subcontractors were hit the hardest. They accounted for 61% of the total. But fewer general nonbuilding contractors failed than in 1953.

- **More large firms fail**—Rapidly increasing contractor failures have taken a heavy toll among large firms as well as small ones. In 1954, there were 120 contractors failing with liabilities of $100,000 or more. This was a 15% increase over the 1953 number and more than five times the 1940 total in this group (See chart). However, these larger firms accounted for only 9% of total contractor failures in '54 compared with 10% in '53.

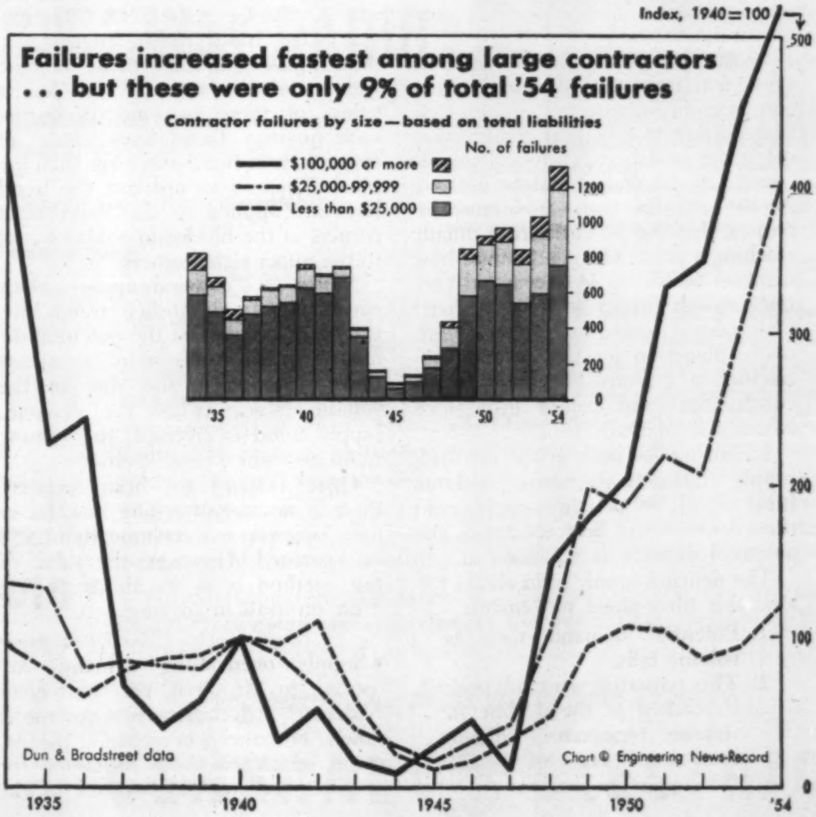
Medium size contractors ($25,000-99,999 in liabilities) increased the most in '54, rising 33% above the '53 count to 431. This was 31.7% of total '54 failures compared with 33% in 1953. Smaller firms (liabilities of less than $25,000) accounted for 58% of total '54 failures, the same as in '53. However, their number increased 27% to a new high of 754.

Some evidence is at hand that contractors are starting to bid more realistically, even if it means going without work till they can find jobs that are profitable. This may mean fewer failures in 1955.

• Conclusion

- 1955 will continue last year's strong uptrend in new business. Competition will continue to be fairly tight, but bidding may be more cautious.
- Financing will be a bit more expensive, particularly home mortgages.
- Costs will keep rising. Equipment will be easy to buy. Materials will generally be available, with possible spot shortages in cement. Labor will be easy to find, and more efficient.

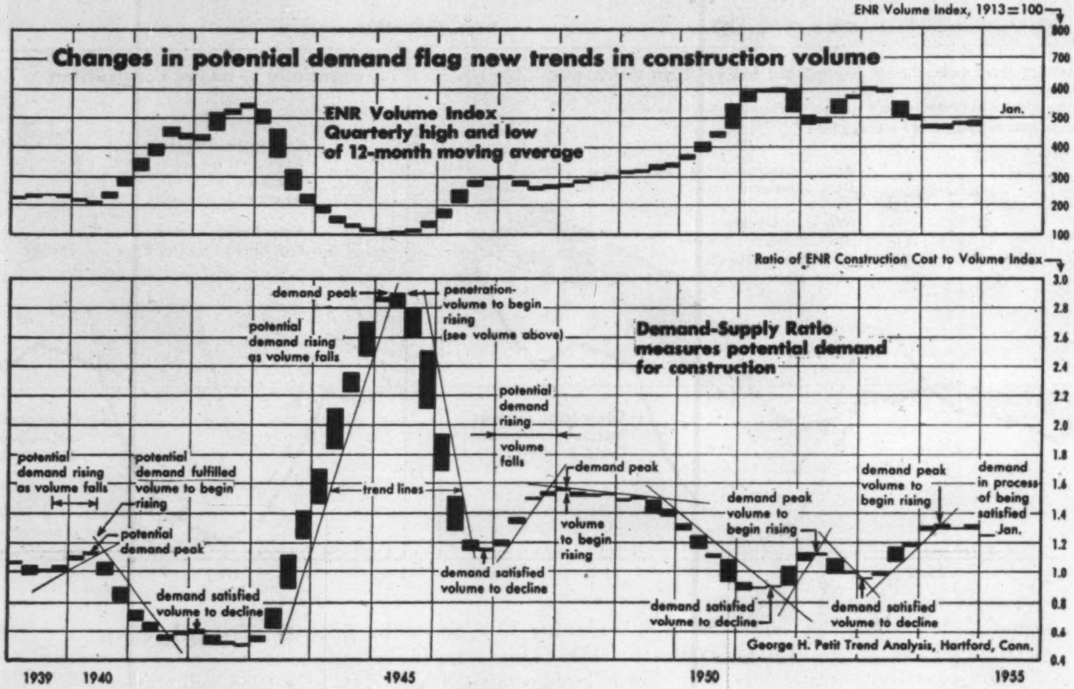
(*Continued on page 66*)



Failures increased fastest among large contractors . . . but these were only 9% of total '54 failures

Dun & Bradstreet data

Chart © Engineering News-Record



Changes in potential demand flag new trends in construction volume

ENR Volume Index
Quarterly high and low
of 12-month moving average

Demand-Supply Ratio
measures potential demand
for construction

George H. Petit Trend Analysis, Hartford, Conn.

New Construction Demand Indicator

A new method of spotting the changes in potential demand for construction is the "demand-supply" ratio developed by George H. Petit as shown in the lower section of the accompanying chart. This is entirely independent of the inflow-outflow of heavy construction in relation to the ENR backlog of proposed construction which is also useful in judging construction's future prospects.

In the new Petit method, construction costs represent "demand" while construction volume is "supply." (It is important to note that construction volume as used here is physical volume —contract awards in constant dollars). As the ratio of costs to volume increases, demand potential rises, finally reaching a peak. The chart shows how demand builds up before actual contract awards (upper section of chart) materialize. According to Mr. Petit, one explanation for this is that contractors as a group anticipate future construction and secure firm price commitments in advance.

Following the peak in the demand-supply ratio, construction volume turns up. The demand-supply ratio then declines and bottoms-out as the potential demand is satisfied.

The demand-supply ratio always follows this three-phase movement:

1. **Potential demand rises as volume falls.**
2. **The potential demand peak is reached as the decline in volume terminates; volume then rises because of the demand-pressure created.**
3. **Simultaneously with satisfaction of demand, construction volume tops out and begins to decline.**

• Trend reversals—The "demand-supply" ratio blocks plotted in the above chart are determined by: the ratio of the highest value of the 12-month moving average of the ENR Construction Cost Index to the highest 12-month moving average of the Volume Index and the ratio of the lowest values of these two indexes during each quarter. Trend lines similar to tangents to a trend curve are then applied. Thus, in an uptrend, the trend lines are applied to the lower right corners of the blocks; in a downtrend, to the upper right corners.

When a "demand-supply" block penetrates an established trend line, this flags a change in the potential demand trend. Furthermore, it means that a change is also due in the volume trend. When the demand-supply trend is reversed, the volume trend also will reverse itself.

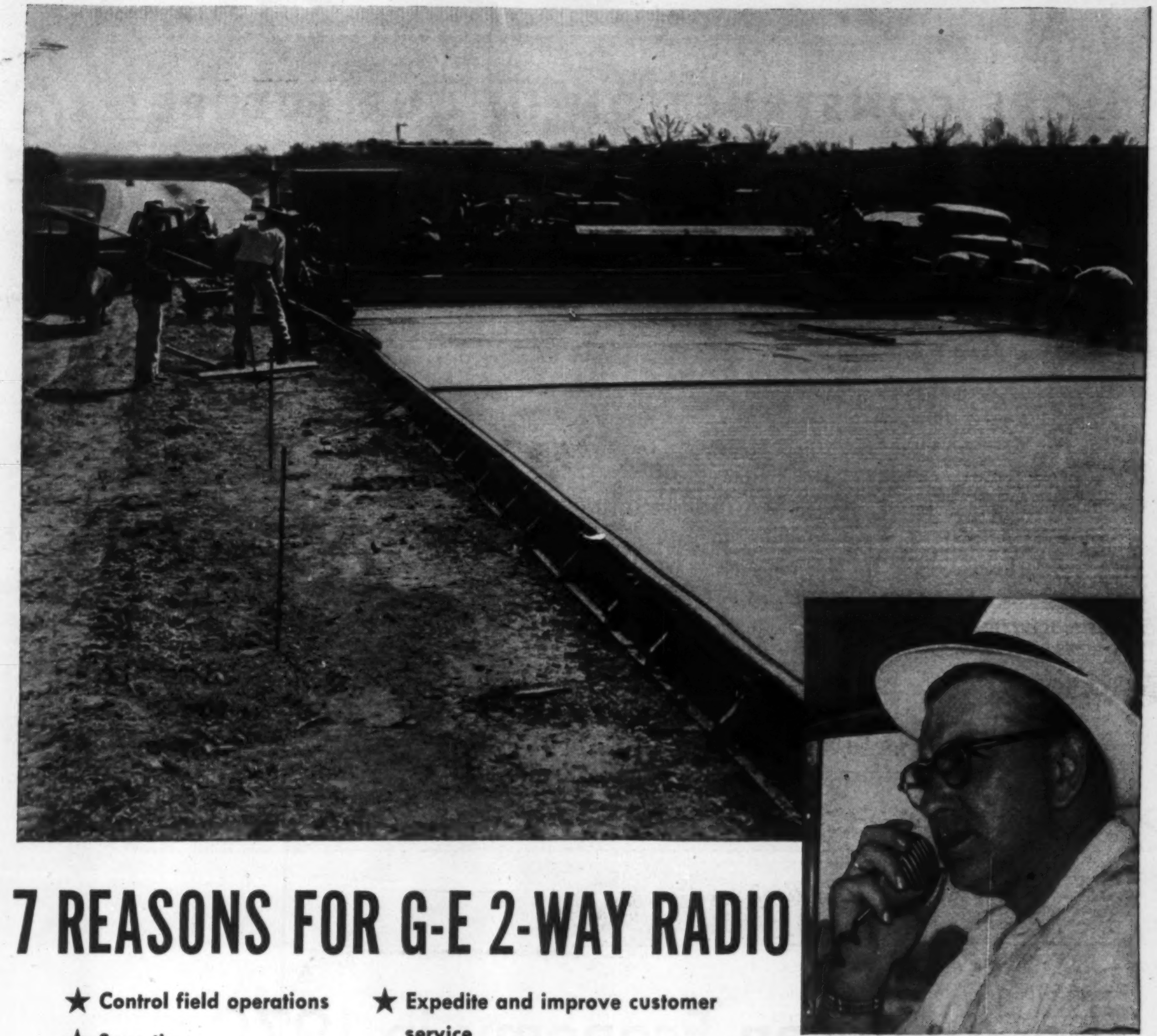
Once a trend has been reversed, there is no way of telling how far or how long the new volume trend will be sustained. However, the value of this method is in its ability to flag these reversals in advance.

• Supply overcoming demand?—According to Mr. Petit, the chart gives evidence "that construction volume is slowly, but surely, overcoming the demand which has been sustained for a decade because fluctuations in the D/S ratio are gradually diminishing in range (depth) and trend changes are occurring more frequently."

A new potential demand was built up from the second quarter of '53 until the second quarter of '54 and is now in the process of being satisfied by a volume surge. Because demand is now being satisfied while the D/S trend is "progressing moderately", Mr. Petit expects construction volume to increase slightly or remain steady until mid-'55, after which the downtrend should resume.

• Caution—Whether or not Mr. Petit's conclusions on the near-term outlook are correct remains to be seen. As already mentioned, a trend reversal in the demand-supply ratio doesn't tell how long or how wide the corresponding changes in the volume trend will be. Volume could keep rising for a couple of years or even more—as in 1948 through the first quarter of '51, following the demand peak in the first quarter of '48.

The chart shows how potential demand has remained almost unchanged for five consecutive quarters. This indicates that build-up in potential demand between the first quarter of '53 and the peak in the second quarter of '54 has been only slightly satisfied. It would appear that volume would have to move higher during the rest of '55 and possibly through '56 before relieving the current heavy pressure of demand. Furthermore, the outlook for further material price and wage increases in '55 will make for a high "demand" component of the D/S ratio.



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The story of the American economy is a story of growth — and growth is construction's business. There have been ups and downs — but the ups have been greater and more prolonged. Result: the amount of goods we produce and consume has about doubled every twenty-five years.

Since it has provided the facilities for this growth, construction has increased in similar manner. And since this pattern is invariable, the prospects for growth in the economy mirror construction's future. Under such circumstances key questions for construction planning become: How fast will the economy grow in the future — and what industries will grow faster than the average for the total economy?

An attempt to answer these questions for the period ahead to 1970 was made during the past year by the McGraw-Hill Economics Department. The results of its study, as presented in the article that follows, reveal the world of tomorrow — the one that it will be construction's privilege to serve — as one of exciting opportunities for great human advancement.

First, by projecting the gross national product (value of all goods and services produced), and then by discussing the prospects for individual industries, the study portrays the growth potential in construction's biggest customer — the American economy. It is not a forecast of the inevitable ups and downs, but a projection of trends. Nor is it a forecast of maximum possible growth, but rather of the probable growth.

Given peace and a political climate favorable to private initiative, the study shows (chart opposite) where we are apt to be in 1970 if we manage our affairs with reasonable wisdom. It forces the challenging conclusion that there is more — much more — construction in our future.

The American Economy in 1970

A Look Ahead at Construction's Biggest Customer

Population in the United States is growing at the rate of over two million persons each year. The gross national product has been increasing at an average rate of over 2% per year since 1930.

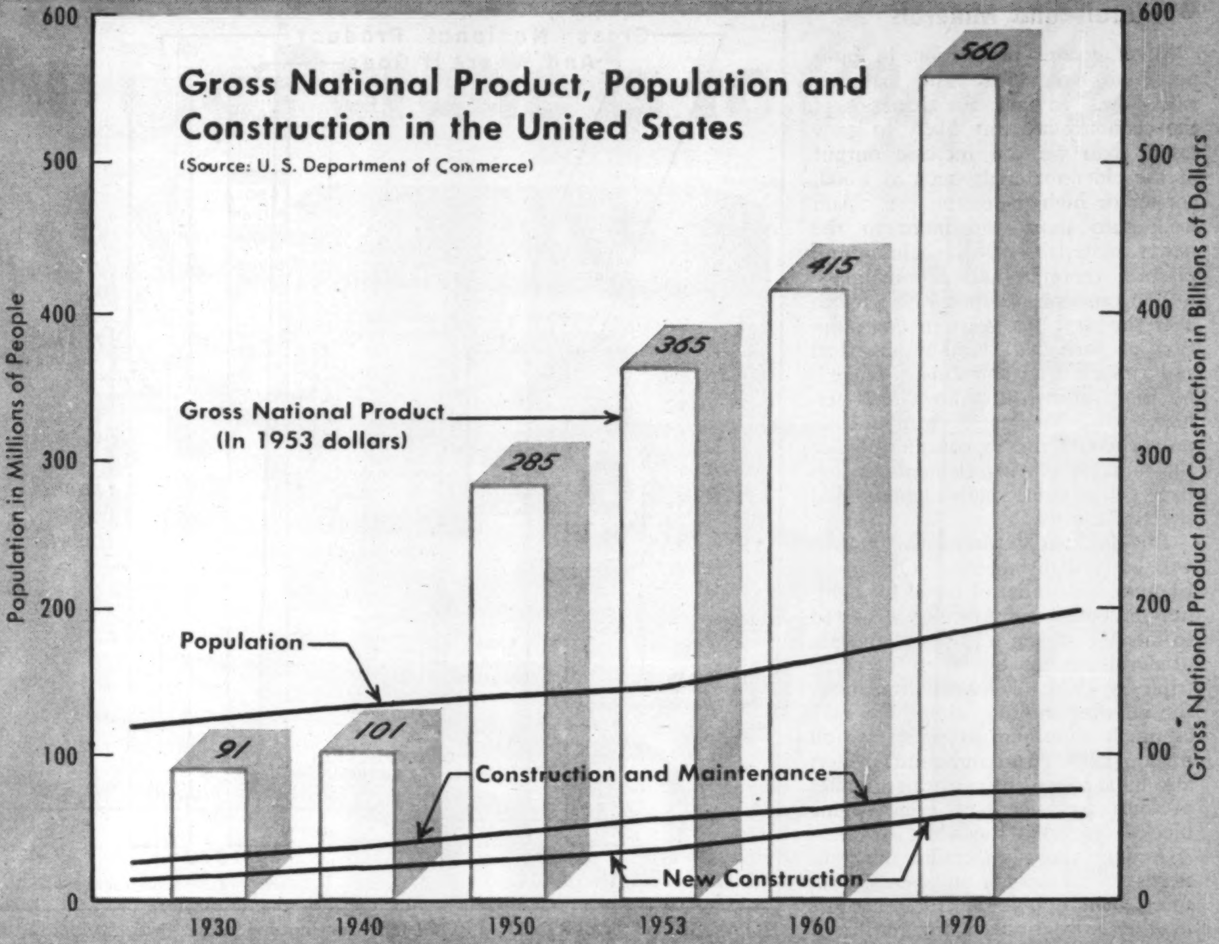
In an over-all way, population and GNP indicate the size of the American economy—how many consumers there are, and how much it takes to supply them. Stated in another way, increasing population provides the labor force to support more production. And it also provides the market for this output. Production, in turn, creates income, which gives the market its buying power.

• It works this way—In 1953, 61 million people out of our total population had jobs. Their average output, measured in 1953 market prices, was $2.82 per man-hour. And they worked an average of 41 hours per week during the 52 weeks of the year—an average that includes weeks when people were on vacation or part-time work, as well as weeks when they worked overtime, including the long hours put in by farmers. The result was a gross national product of about $365 billion.

From this total output of goods and services, about $60 billion went to replace resources and capital equipment that wore out during the year. About $60 billion went for government services (including defense) and was paid for out of taxes.

The rest of the national product, $245 billion, became the real income of individuals and business firms. It consisted of materials and equipment for business use, and goods and services for consumers. As it was produced and sold, there was created $245 billion of money income in the form of wages, salaries and profits with which the goods could be bought. Of course, in our interdependent economy, few people bought the same things that they produced. But in total, the dollar income created by production was equal to the value of the output. And this created the market to buy the goods.

How much will our national product increase in the future? A reasonable projection of what it will amount to in 1970 is shown beside the 1953 picture in the chart on page 70. And the key factors in the projection are the size of the market to be served,



Gross National Product, Population and Construction in the United States

(Source: U. S. Department of Commerce)

the labor force available, and—perhaps most important—the resources and skills that the labor force can put to work. In other words, it will depend largely on the output per man that our labor force can achieve. The economists' term is "productivity", which – strictly defined – means the amount of national product resulting from one man-hour of labor.

• Will productivity rise?—By 1970, the total market is going to grow considerably, with total population reaching over 200 million, according to the Bureau of the Census. A smaller rate of growth is forecast for the labor force which will grow to 82 million by 1970. But what of its productivity?

From 1930 to 1950, productivity (output per man-hour) increased about 2% per year. Since 1950, the gains have been somewhat larger. With further improvements in technology during the late '50s and '60s, we may hope that average output per man-hour will increase as much as 2.5% per year. This will call for the best equipment, the best in management ingenuity and the best in labor cooperation.

If such a level of productivity is attained, gross national product will grow from $365 billion in 1953 to $415 billion in 1960 and to $560 billion by 1970.

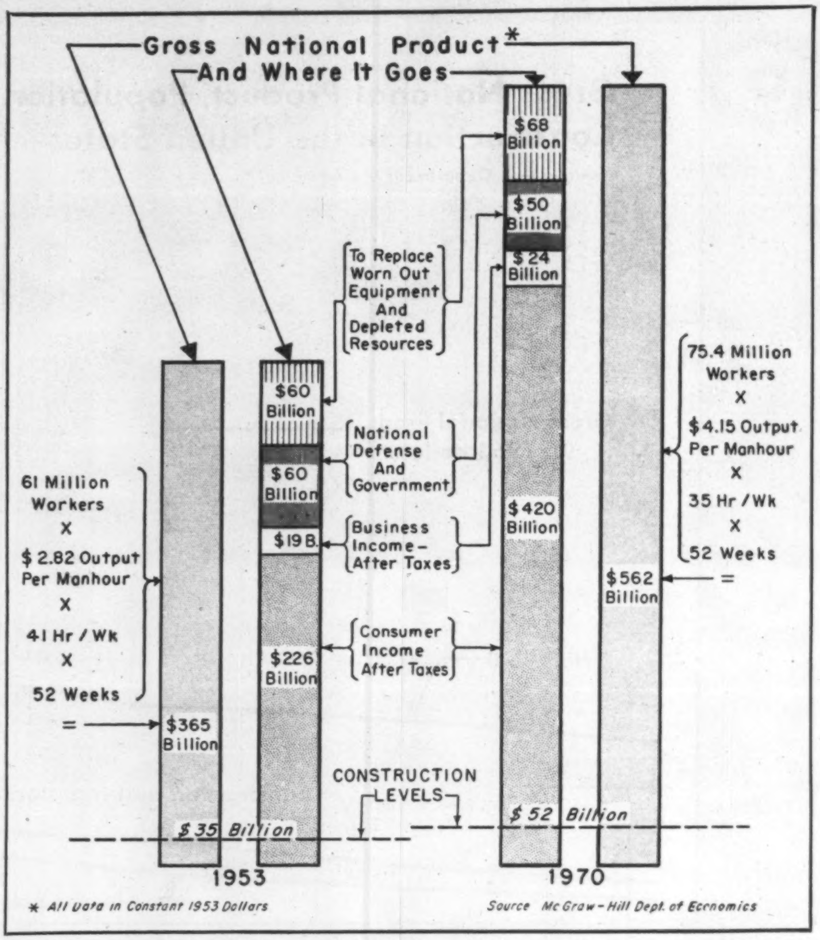
Moreover these estimates allow for a drop in the average work-week from 41 hours in 1953 to 38 hours in 1960, and to only 35 hours by 1970. It seems reasonable to expect that one result of higher productivity will be this increase in leisure.

Finally, the distribution of our national product will probably be different in 1970 from what it was in 1953. If defense needs are lower, as we hope they will be, the government share of national product will be less; and there will be more real income for business and consumers.

• Changing Technology – Forecasting the future, however, is more than a matter of saying how many dollars worth of goods will be produced. There's also the question of technology—what sort of materials and production techniques will be developed? In the years ahead, changes in technology may create as many new demands as the increase in sheer quantity of goods consumed.

A portent of this is seen in industrial research, expenditures for which have grown in the past ten years from about $1 billion per year to over $3 billion. The result has been to create new products and even new industries. For example, in the past five years, electronics output has increased 145%; output of plastics is up 85%; the-production of aluminum is up 100%. Even companies in such well-established fields as food processing have close to 20% of present sales in product lines developed since World War II.

No one knows what surprises the technology of 1970 may hold in store. But we can already see a whole series of industrial revolutions in the making if we look first at such basic areas as materials, power and manufacturing methods, then at the capital goods requirements of specific industries and finally at the consumer market.



* All Data in Constant 1953 Dollars

Source McGraw-Hill Dept. of Economics

HOW GROSS NATIONAL PRODUCT can increase more than 50 percent by 1970 because of increases in workers and productivity, and in spite of a shorter work week. A corollary is a 50 percent increase in construction.

• Metals and Minerals

With greater production in prospect, our needs for basic materials will grow. In fact, the demands of the economy are very likely to grow faster than we can increase output of the older materials—such as wood, copper or high-grade iron ore. And we'll turn more and more to the newer materials—such as aluminum, plastics, ceramics and fibrous glass.

You can expect about 15% growth over the next ten years in consumption of such old stand-bys as steel and copper, lead and zinc. There'll be more growth in alloy steel—perhaps 30%. That means a more than proportionate rise in consumption of the valuable alloying elements—things like columbium, molybdenum and the rare earths.

But the really spectacular growth will be in light metals. Output of titanium—a wonderful metal for lightness and heat resistance—is expected to increase several fold. And the use of aluminum may double in ten years, triple by 1970. Ten years from now, the building industry alone may take as much aluminum as went into all uses in 1953. And aluminum makers also hope to see an increasing number of auto parts—perhaps even engine blocks—cast from the white metal.

Among the nonmetallic minerals, needs for phosphate and potash will more than double by 1970 because of the growing need for fertilizers. This will also promote fairly rapid growth in consumption of sulfur. Fluorspar—used in making glass and aluminum—is another mineral with expanding markets.

• Chemicals

Total production of chemicals is expected to rise 150% by 1970. And growth in some lines will greatly exceed this average. Plastic materials output, for example, should top 6 billion pounds in 1970, compared with 2.8 billion pounds in 1953. Among the big uses that lie ahead are these: in homes—walls, ceilings and furniture; in industrial plants—pipes, dies and heavy bearings; in consumer goods—auto body parts and housings for large appliances.

Synthetic fibers—like plastics—are also rapidly expanding in use. Output may triple by 1970. The new fibers are not likely to eliminate wool and cotton in apparel uses, but they will take over much of the market in the form of blends, for winter as well as summer wear. And nylon will take a big share of the market for industrial fabrics.

Drugs will be needed in ever-larger quantities. Doctors will prescribe for more people in the '60s than ever before, as industry and government step up their medical aid programs, and as individuals gain the incomes to afford better care. Our aging population will, of course, need more and special drugs.

Chemicals for the farm will raise crop yields and help offset rising labor costs. That means more fertilizers, insecticides and weed killers. New drugs are being used to stimulate growth and reduce disease among livestock. Altogether, the farm market for chemicals may double by 1970.

Most industrial chemicals will track along with the general growth in industrial production. But the sharpest growth within this group will be in synthetic organic chemicals. And among these, the petro-chemicals—those made from oil—stand out. By 1970, about ¾ of all synthetic organics will be made from oil and gas. (Not long ago it yas ¼ from petroleum, ¾ from coke oven byproducts.)

Investment in petro-chemical plants—already over $3 billion—will double by 1960, with new expenditures averaging $500 million per year. And by 1970 output of petro-chemicals may triple.

Cement, gypsum, glass and plywood are among other items that will double in use by 1970. The growth trend is also very strong for paper and paper-board, and for other materials used in the packaging field.

• Fuel and Power

By 1970 we shall also be using twice as much power per worker in industry, and five times as much electricity in the average home as today. The total result: three times as much electric power consumed each year.

Where will we get the fuel? Mostly, from the same sources we use now—coal and oil. But by 1970, as much as 20% of the new power installations (3% of capacity in place) may be utilizing atomic fuel. Up to 1970, the main effect of the rise in power generation on fuel demand will be to increase coal requirements of the power industry. These may go up 150% by 1970, even with improved burning techniques.

(Continued on page 74)

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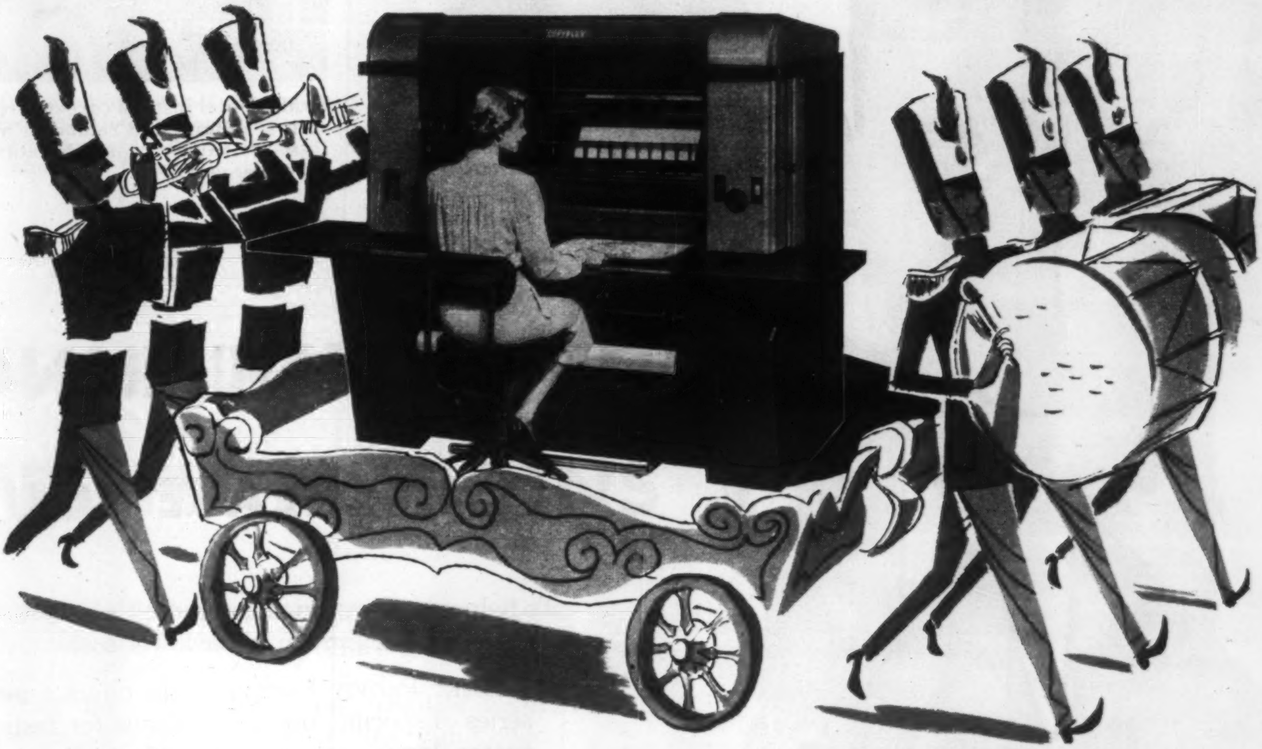

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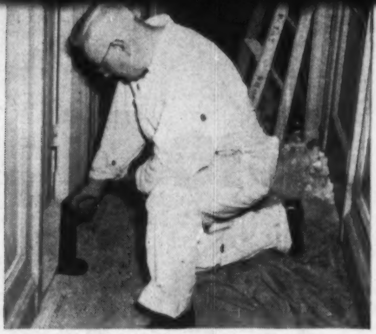

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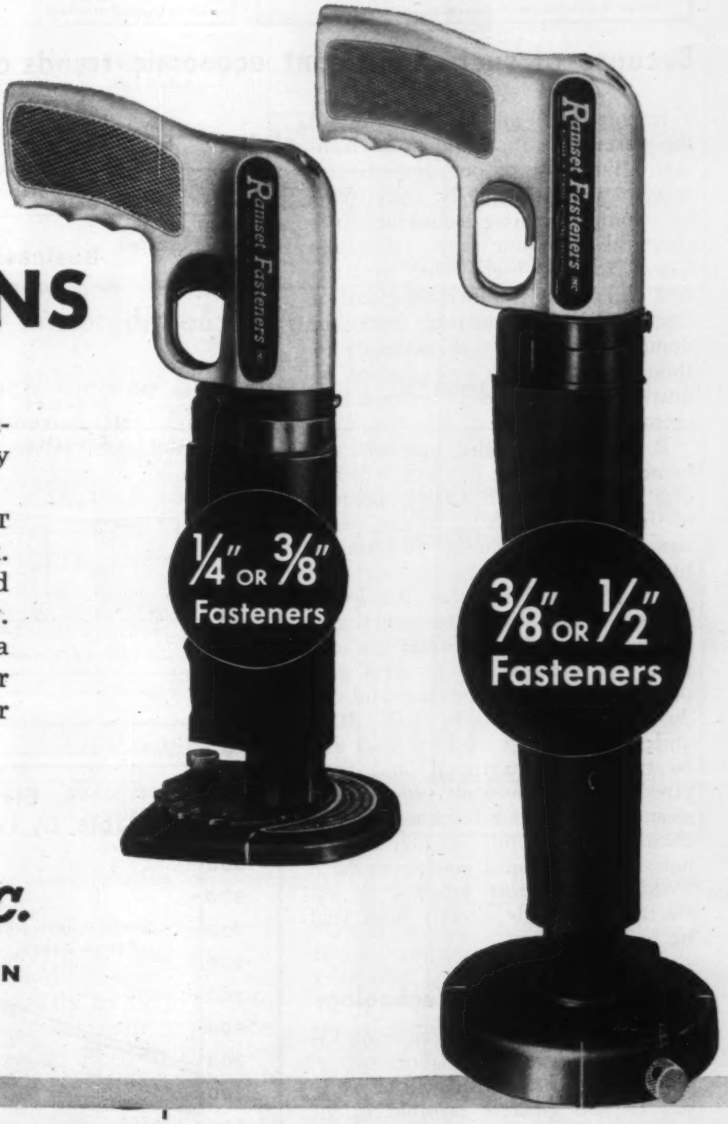

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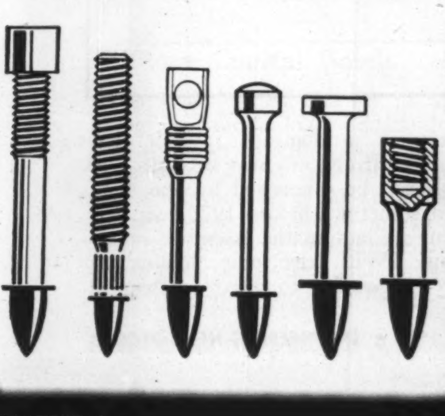

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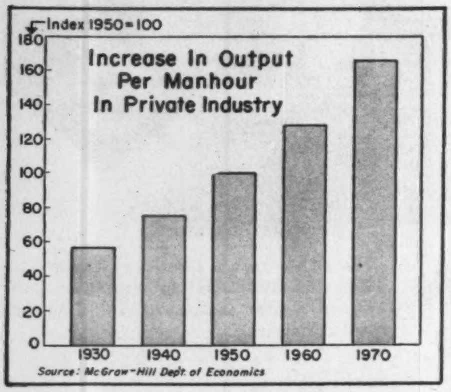
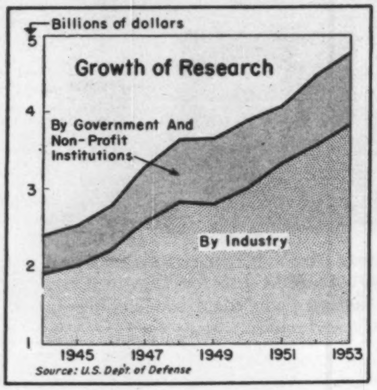
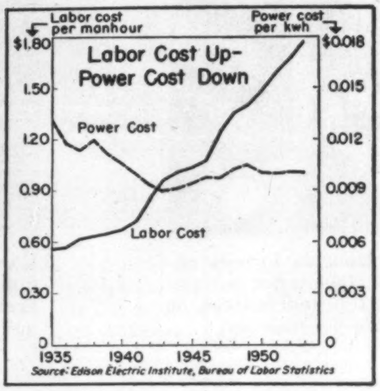


Source: McGraw-Hill Dept. of Economics



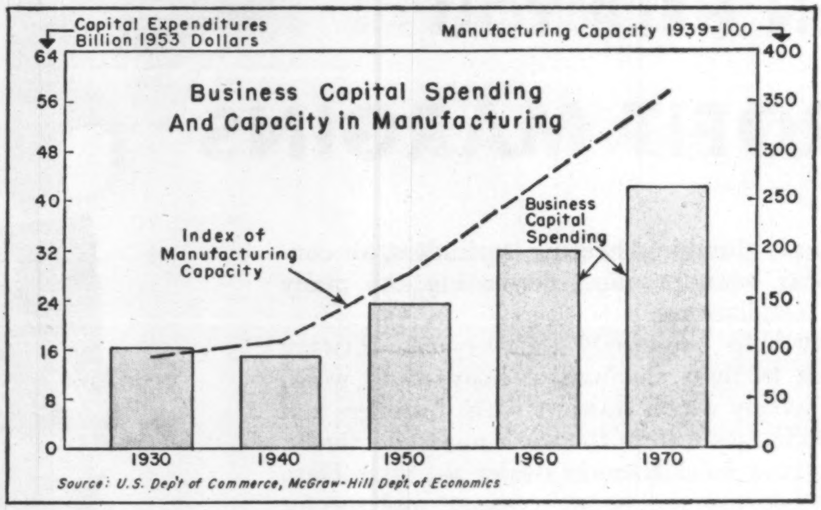
Source: U.S. Dept. of Defense



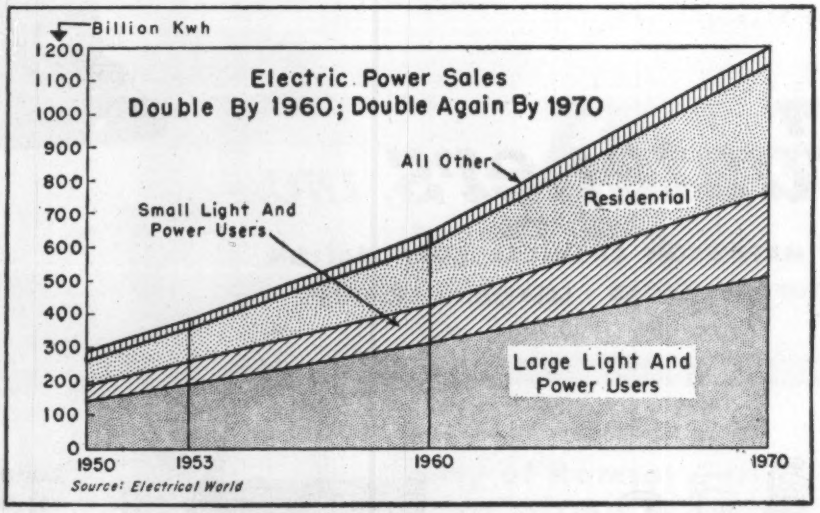
Source: Edison Electric Institute, Bureau of Labor Statistics

Because of such significant economic trends as these . . .

. . . expansions like these are predicted



Source: U.S. Dep't of Commerce, McGraw-Hill Dept. of Economics



Source: Electrical World

Imported fuel oil will still be useful for power generation and home heating. But most of our domestic oil supplies will probably be converted—by improved refining techniques—into chemicals, gasoline and lubricants. These are the high value products that will justify the increasing cost of discovery and production from our domestic reserves. If necessary —though also at high cost—the oil industry can convert shale or coal into petroleum-type fuels.

It seems certain that our total demand for petroleum products will rise over 100% by 1970, mainly because of the increase in travel by car, plane and train—all driven by fuel-hungry turbine engines.

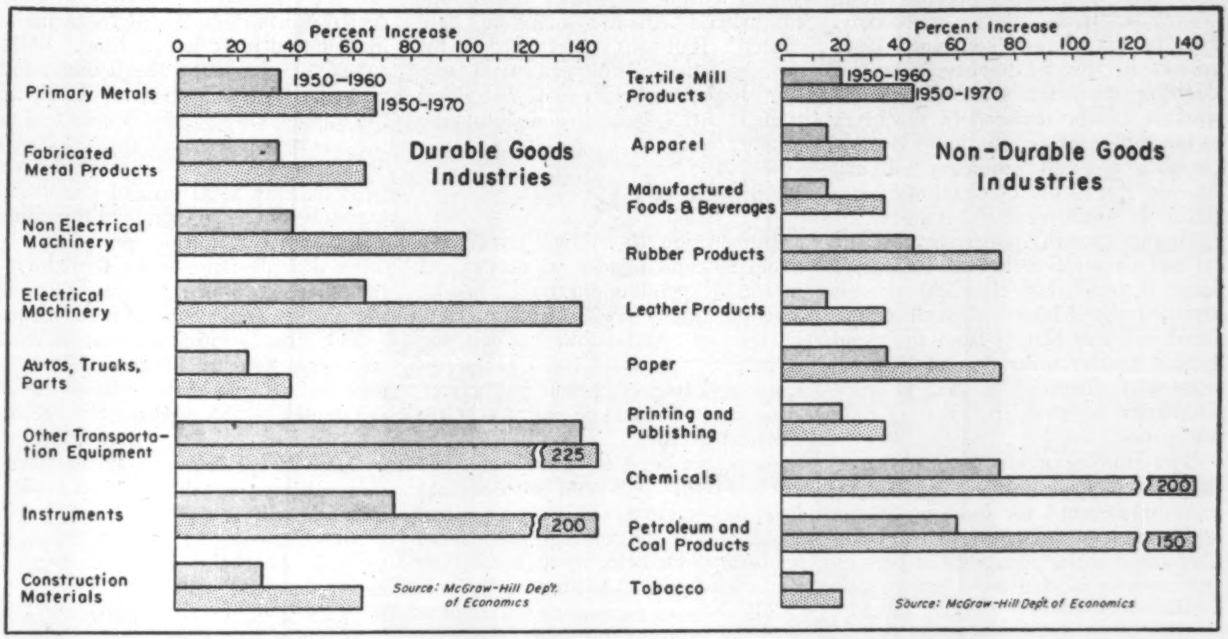
An increasing share of the home heating market will go to natural gas. In fact, most of our natural gas supplies will probably go for this purpose, leaving other heating and industrial requirements to coal. It is quite possible that by 1970 coal will be gassified underground, and then piped directly to plants for use in steam boilers or for breaking up into chemical compounds. It may also be noted that chemical companies have already made great progress in extracting chemicals directly from coal by hydrogenation.

• Manufacturing Technology

Another industrial revolution is slated in the field of manufacturing. The factory of tomorrow will be working to the greatest possible extent with plastics and fluid metals that can be molded or poured in continuous operations, rather than cut into shape by machining. Where cutting operations are still necessary, they will be done by batteries of inter-connected tools, not by men working at separate machines.

Also, it may be expected that all materials will be handled automatically. Better conveyors, more powerful motors and new devices for turning and positioning heavy pieces will make it as easy to move heavy metal parts from station to station as it is to move lighter products today.

As machine tools operate at higher speeds, work will be fed to them from automatic conveyors and controlled by electronic mechanisms. With electronic controls, an entire succession of tools can be supervised by one man. And sometime before 1970, we may even see automatic assembly operations. With electronic "brains" it may be possible to direct mechanical

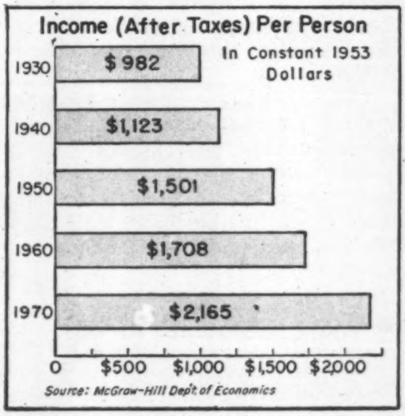


Source: McGraw-Hill Dep't. of Economics

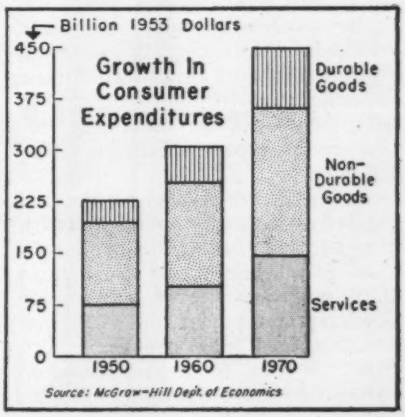
Source: McGraw-Hill Dep't. of Economics

Such production increases as these are predicted on the basis of . . .

. . . such income and spending increases as these



Source: McGraw-Hill Dep't. of Economics



Source: McGraw-Hill Dep't. of Economics

fingers in assembly operations that today require many man-hours.

The metal-producing industries are developing spectacular techniques to speed up operations. These include continuous casting of steel ingots, hot and cold extrusion, improved casting and forging methods for both steel and non-ferrous metals. Tomorrow's factory will get a wide variety of metal parts that have been molded or extruded in a continuous process linked to primary metal production, with very little direct labor involved. High-speed stamping and shearing operations will be linked up with steel rolling mills to process hot metal moving at over 2,000 ft per minute. As speeds increase, the measurements of the steel will be controlled by using X-rays or radioisotopes to activate mechanisms that will correct and flaw automatically.

Similarly, in quite a different field, the food processing plant—complete with electronic controls—may get its raw material directly from the harvesting machines in one continuous operation, not unlike the flow of steel from the rolling mill to the stamping plant.

• More Capital Goods

These and other changes in technology will create higher demand for capital goods. Capital spending will be greater than in an economy that was simply producing the same goods by the same methods—even in increasing quantity. In addition to increasing capacity, the rapid pace of technical improvements will call for continuous modernization of plants and equipment.

To keep pace with the growth in population and gross national product will require a 65% increase in manufacturing capacity by 1970. Electric power companies must triple their generating capacity. Railroads and truck operators will need equipment to handle 80% more freight. And the number of firms engaged in wholesale and retail trade may increase as much as 150%. All this means a substantial growth in future requirements for plant and equipment.

But, in addition, there will be the tremendous demands for modernization to keep up with research developments. Over the long run, replacement and modernization expenditures may account for as much as two-thirds of all capital expenditures.

Taken together, needs for new capacity and needs for modernization may result in as much as $32 billion per year of business capital expenditures in 1960 and over $40 billion by 1970, compared with $28 billion in 1953, the greatest year so far recorded for capital spending. Just as one example, electric generating equipment will be sold in twice the volume achieved in 1953. This is a striking illustration of what it will take, in terms of capital equipment, to meet the needs of a growing America.

One field where there is great potential growth is that of industrial instruments and controls. Production may increase 150% by 1970, with electronic controls leading the group. Growth in this field appears limited only by the speed at which factory managers can absorb and apply all the new developments.

(*Continued on page 76*)

Another field with especially strong growth prospects is office machinery. Two factors promise continued rapid growth in this field where sales are doubling every ten years: (1) clerical workers will be replaced by machines in the dull, routine jobs; and (2) more complex research problems will call for widespread use of electronic computors in government and industry.

Bright growth prospects for the oil and chemical industries indicate a large demand for chemical process equipment. Makers of such equipment will also benefit from the trend toward greater utilization of by-products and chemical wastes in such industries as steel, petroleum, pulp and paper.

The growing popularity of packaged food products indicates a steadily increasing demand for food processing and packaging machinery. And farther ahead is the possibility of preserving foods by irradiation—a new process whose introduction would require heavy capital expenditures.

A high rate of obsolescence promises to create large demand for new types of metal-working machinery. About 55% of our present machine tools are at least ten years old, and nearly all are obsolete by today's high-speed standards. And an equally great modernization job lies ahead for foundries and other metal-forming plants. Similarly, with textile machinery, big changes are expected during the next ten years.

The high cost of labor for the mining industries seems bound to add to the demand for highly automatic mining machinery. For example, there will be more of the recently developed equipment for cutting and handling coal in a continuous flow from the seam to the surface—eliminating the dangerous and unpleasant tasks previously done by miners. New oil and gas discoveries will provide a steady and growing demand for oil field equipment.

In construction and agriculture—as in mining—machines will be in ever-increasing demand to replace scarce labor. So output of tractors, farm implements and earth-moving equipment will show considerable gains. The export market for this type of machinery also has tremendous potential.

Manufacturing, mining and construction all provide markets for a rapid increase in sales of materials handling equipment—to move things any distance from a few feet to several miles, without human muscle.

Faster distribution of goods will require more transportation equipment. Since the trend is toward moving a greater share of freight by highway or by air, we may expect substantially higher output of trucks, trailers and commercial aircraft, including helicopters. Railroads' chief need is for modernization. They may spend large sums for better freight cars, centralized traffic control systems and automatic retarder yards.

● Public Works

In addition to a large private demand for capital goods, we may expect increased spending on public works. There are many new demands for public services. And public construction is necessary to meet them. It seems reasonable to predict that public construction will increase every year for the next decade.

As people begin to spend more time outdoors, they will want more air and light in the cities. This means urban rebuilding—more parking space, more recreational facilities, more landscaping and improvements to streets.

The growing population will require more and more community services—schools, hospitals, water supply and sewage disposal. By 1970, we shall have to double our elementary school capacity. And even to meet present medical standards, we shall have to double our hospital facilities and replace another third that are unsuitable.

Greatest of all is the need for highways. To accommodate the steady increase in traffic, our expenditures on streets and highways must double long before 1970. This is the only way to get highways that will carry the load with more convenience and safety.

● More Consumer Goods

But if the opportunities for the capital goods industries are good, those for consumer goods industries are even better. As our national product increases, a larger and larger proportion can go for raising the standard of living—for consumer durable goods, housing and home improvements, and for travel and recreation.

It is estimated that by 1970 per capita income may rise over 40% from the 1950 level. That would be real income, measured in constant prices. And most of the gains will occur as people from the lower income brackets work up to middle incomes—and later fairly high incomes—where they can greatly increase their spending.

More people with higher incomes means spectacular growth in total consumer spending. Consumer expenditures (in 1953 prices) may increase from $230 billion in 1953 to $285 billion in 1960 and to $420 billion in 1970. And it is important to note that people will be getting both more income and more leisure time. Both are factors in raising the demand for consumer items, particularly those in the luxury class.

• **Housing**—It seems appropriate to treat housing as a form of consumer spending since it responds to the same influences as consumer spending on other durable items—even though, in the official government statistics, housing is considered a form of investment.

The greatest improvement in the American standard of living between now and 1970 is likely to be in housing standards. Mass-production methods—whether factory prefabrication or large-scale fabrication at the site—should bring costs down. And higher incomes will lead to a demand for higher quality. So the homes that are built in the future will be bigger, better designed and better furnished than those of the past decade.

The prefabrication dream of turning out standard, low-cost housing, much as we now produce cars—even to trading in housing sections or complete houses—may yet come true.

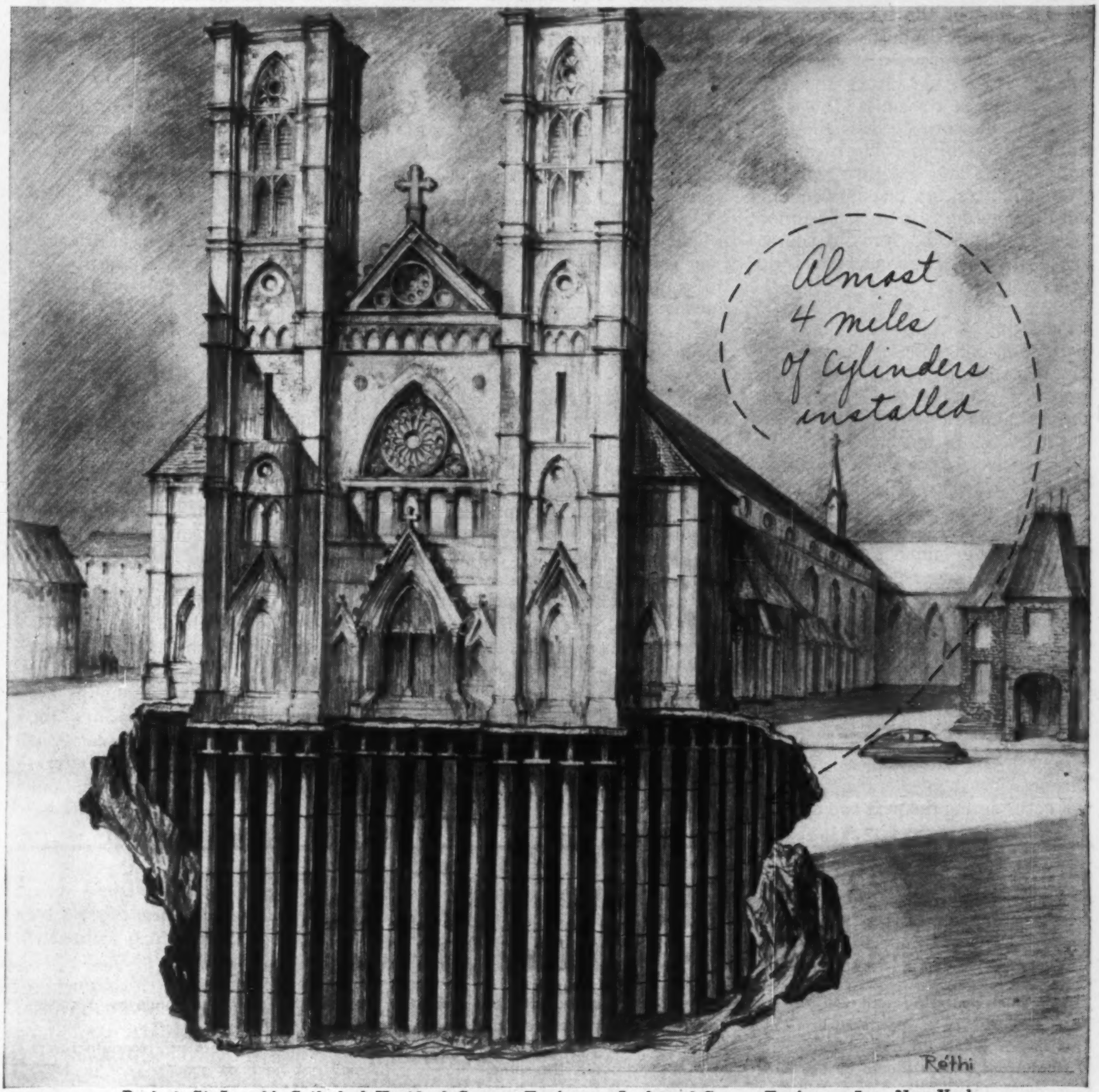
As a result of all these factors, new housing starts in the 1960s (when new family formation will also be very high) are likely to average 1,500,000—or more. And as many as 500,000 homes per year may be altered or remodeled in substantial degree.

• **Consumer Durables**—The increase in homebuilding and home renovation will greatly expand the market for electric appliances. By 1970 most new homes will be completely air-conditioned year-round. The electric heat pump and electric resistance heating will be in widespread use. New homes will include more of the appliances that save work for the housewife—automatic washers, dryers, dishwashers and waste disposers and others not yet invented. It is not inconceivable that television sets (color, of course) will be built into half the rooms in the house (and out to the garage) for interfamily communication. The increasing appliance load will necessitate rewiring many homes.

The automobile market—largest of all for consumer durables—is still expanding, despite all talk of saturation. Growth factors include the increasing number of families, the trend toward two-car ownership and the industry's ability to create new types of specialty cars—such as station wagons, sport cars and small economy cars. People will have more time for travel and recreation.

Passenger-car production in 1970 is

ANOTHER PROBLEM SOLVED BY SPENCER, WHITE & PRENTIS


Almost 4 miles of cylinders installed
Réthi

Project: St. Joseph's Cathedral, Hartford, Conn. • *Engineers:* Lockwood Greene Engineers, Inc., New York
Architect: Maginnis and Walsh, Boston, Mass.

PRETEST UNDERPINNING STOPS SETTLEMENT AS COLLAPSE THREATENS

This 31,000-ton 19th century cathedral was sinking into the clay. Masonry had cracked badly and collapse threatened when our organization, as specialists in underpinning, was called upon. Nearly 4 miles of Pretest Cylinders now give secure support, with ample safety margin. This represents one of the largest single underpinning operations ever performed.

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likely to reach 7.5 million units, compared to 6.2 million in 1953. But this may not be the full measure of the automobile industry's growth. By 1970, there may be a substantial market for personal planes—the next step forward in consumer transportation. At present, it seems that the family plane will probably be a helicopter. The auto industry, with its great resources for mass production and distribution, is in a good position to enter this field. And, of course, the regular aircraft manufacturers will also benefit.

• **Food and Textiles**—Consumer demand for food and textile products will increase gradually, in line with the growth in population. There will also be a shift toward better quality in these items as incomes go up. By 1970 the average man or woman may own twice as many separate garments as today, suitable for a greater variety of climates and activities. In the food field, the number of packaged items for the super-market shelf will continue to increase. And by 1970, it seems possible that some food items may be prepared synthetically by the chemical industry, at a lower cost than food processed from agricultural products.

• **Travel, Recreation and Services**—The great increase in leisure time that will occur during the next two decades opens up a potential market for a wide variety of products and services. It is impossible to tell just how people will choose to spend their leisure. The biggest gainer in recent years has been the television industry. And such entertainment in the home—undoubtedly with improved communication devices—may well continue to take up a large part of the increase in leisure time.

But the most obvious way for people to spend a lot more leisure time and money is on travel. And the means of transportation are improving so rapidly as to foster an increase in travel for that reason alone. Highways are being improved. Cars are easier to drive. And by 1970 people will be using helicopters for short trips. It's a fair prediction that, by then, helicopter service will be in the same class as bus travel today.

On longer trips, jet planes will eliminate fatigue by making transcontinental trips in a few hours without noise or vibration. For medium length journeys, railroads will have lightweight cars with speeds far exceeding those of conventional trains. The greater speeds and reduced fatigue on long trips will extend normal vacation areas to any point in the continental United States, Canada, Mexico or Western Europe.

The greatly increased mobility of the population will mean a tremendous increase in expenditures for all sorts of goods: travel and resort clothing; motor fuel and accessories; luggage and sporting goods (including cameras); roadside eating and amusements.

To sum up, this look ahead to 1970 reveals an economy both vastly greater and with many new characteristics. The picture is one of enlarged opportunities and more plentiful rewards—of a growing and better America.

THE MEANING for construction in this look at the road ahead is clear. Construction moves upward with an expanding economy—serving it and contributing to its growth at the same time.

Beyond the specific references to construction growth in the article, the new products that are forecast and the increased production that is foreseen both carry implications of more construction. So obviously do the predictions of twice as much power, 40% larger personal incomes, 80% greater consumer expenditures, and needs for twice as many schools and hospitals and for doubling our transportation facilities.

In short, for construction, a gross national product of $560 billion by 1970—and President Eisenhower has said we should be approaching the $500 billion mark in 10 years—can only mean one thing: There is more—much more— construction in our future.

For 1955:

Industry by Industry Preview

The steel operating rate will rise to 78% from the 71% registered in 1954. This means about 96 million tons.

Nonferrous metals should be up. Last year aluminum output hit an all-time high, while the production records of copper, lead and especially zinc were not so sensational. This year the nonferrous metals industry, as a whole, will better last year's performance in both output and consumption.

Manufacturers of chemicals are looking forward to 1955, when the long-term growth rate of the industry will reappear. Plastics, textiles, steel, paper, glass are just a few of the industries that will contribute to at least a 5% increase in chemical output this year.

The machine tool industry, after several years of very high activity, is going to have tough sledding this year. Backlogs have shrunk. Shipments of machine tools may run about $650 million, compared with $850 million last year and $1.2 billion in 1953.

The auto manufacturing industry turned out 6.3 million cars and trucks in 1954. In 1955, output is expected to total approximately the same.

Railroad equipment production fell drastically in 1954. The outlook for this industry for the year ahead is very poor.

Aircraft production declined slightly during 1954, because the government spent fewer dollars for planes. Production this year should be stabilized at current levels.

Construction machinery manufacturers can expect a big year in 1955. All types of heavy construction will boom in 1955, with the exception of industrial building.

Farm machinery output, depressed for a couple of years, will not be helped by the fact that the outlook for the farmer is somewhat worse than last year.

Office machinery, a growth industry in recent years, had its best year in 1954. New orders for office equipment have been running ahead of a year ago, so output and shipments are expected to top last year's performance by a considerable margin.

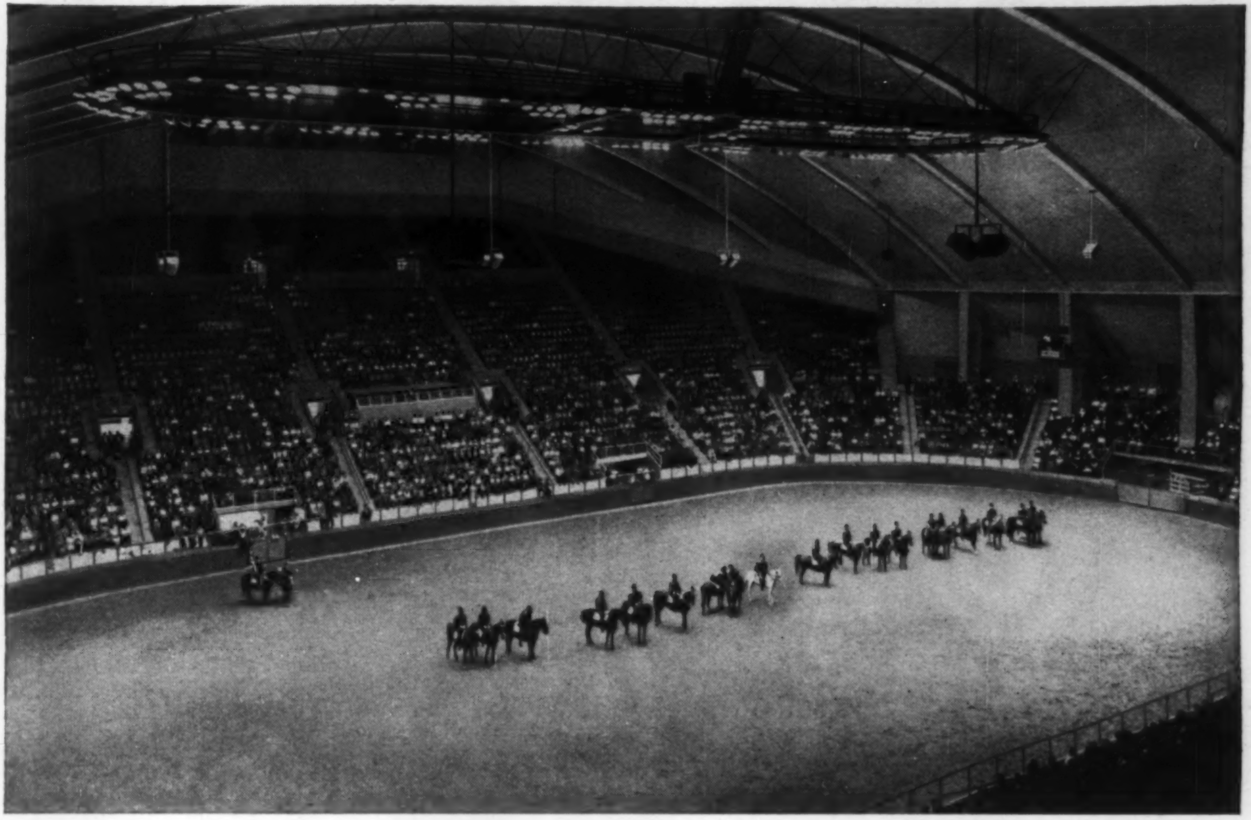
Electrical apparatus manufacturers may not have as good a year in 1955 as in 1954. Backlogs, although still relatively high, have come down considerably from previous peak levels.

The petroleum refining industry is expecting higher output in 1955.

The rubber industry can expect another good year. Replacement tires are the biggest factor since, with the same number of cars and trucks produced as in 1954, there should be no change in the original equipment market.

Lumber production, because of strikes, was down about 8% in 1954. And with increased construction activity, inventories have virtually disappeared. Thus production of lumber should rise substantially in 1955.

Such construction materials industries —as those producing cement, glass, brick and gypsum products—are heading for another boom year in 1955.



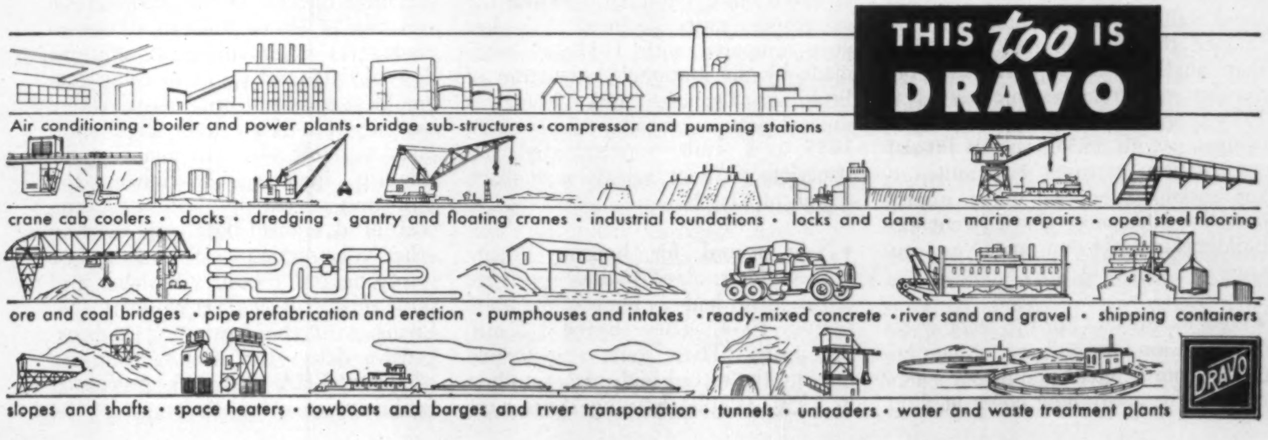
HOW ALABAMA ECONOMICALLY HEATS ITS GIANT INDOOR ARENA

The new Alabama State Coliseum, which seats up to 15,000 people under one roof, posed many unusual space heating problems . . . all of which have been effectively solved by the use of Dravo Counterflo Space Heaters.

Uniform comfort for this huge block-long arena at Montgomery, Alabama, is supplied by seven, automatically-controlled Dravo Heaters. These heaters pull in fresh, outside air and heat it for distribution to all parts of the building.

The operators of this coliseum believe that the Dravo system not only brings temperatures up to comfortable conditions quickly but also provides unusually efficient heat distribution for such a large structure. In addition, they are well pleased with the operating economies which have been obtained.

Today more than 10,000 Dravo Heaters, large and small, have been installed for heating and ventilating all types of industrial and commercial buildings. This is another example of how Dravo has been serving business and industry in a variety of engineering fields for over 60 years. Dravo considers customer satisfaction essential in all its products and services. DRAVO CORPORATION, PITTSBURGH 25, PENNA.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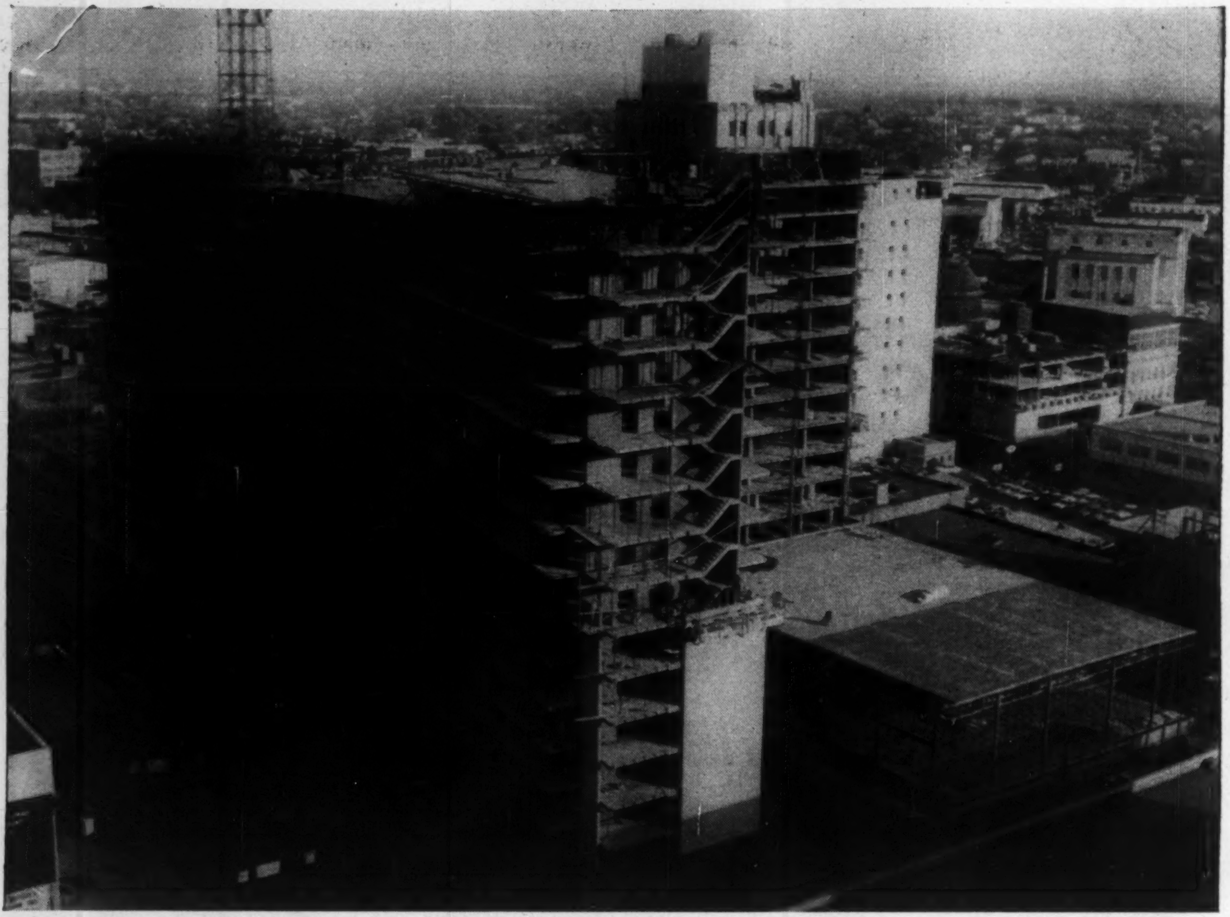
ore and coal bridges • pipe prefabrication and erection • pumphouses and intakes • ready-mixed concrete • river sand and gravel • shipping containers
slopes and shafts • space heaters • towboats and barges and river transportation • tunnels • unloaders • water and waste treatment plants
DRAVO



STATLER HOTEL in Dallas has 18-story flat-plate concrete frame with many cantilevers. Shear walls provide lateral resistance.

Techniques and Trends . . .

Buildings and Housing

The building segment of the construction industry had another big year in 1954, and the end is not yet in sight. True, industrial building fell off, but the continuing and expanding boom in other types of building made up for it and gives promise that 1955 will be an even better year.

In addition to a high level of activity, some of the newer materials and construction techniques continued to make headway in 1954. Exterior walls for tall buildings were developed that are thinner and lighter than anything used previously. The number of structures prestressed in 1954 appears to have at least doubled compared with 1953. Use of lift-slab construction increased, with multistory applications becoming more numerous. And 20% more plastics went into buildings in 1954 than in the previous year.

• **New record set**—For the second year in succession, the volume of nonresidential commercial building set a new record. The continuing boom in shopping-center and office-building construction sent the value of contracts awarded to $1.42 billion. This tops last year's record mark by $260 million.

Chances appear good that the new record will not stand for long. With consumer spending at a high level, the shopping center boom can be expected to continue. And office space is still tight, encouraging construction of more office buildings. (While the occupancy ratio declined 1% last year compared with 1953, a survey made by the National Association of Building Owners and Managers showed occupancy to be 97.12%.) In 1955, as a result, nonresidential construction contract awards may reach a high of $1.5 billion.

• **Near record for housing**—Private homebuilders, aided by easy mortgage terms, also had a remarkably good year in 1954. They started 1.2 million units. These starts were topped only by the record high of 1.4 million in 1950. (Public housing starts were almost negligible last year—probably less than 20,000.)

Encouraged by easy credit terms inspired by the National Housing Act of 1954, homebuilders are optimistically predicting an even better year in 1955. They believe there is a good chance they may equal the 1950 record. However, they face some difficulties.

As outlined by John M. Dickerman, executive director of the National Association of Home Builders, these include: (1) Maintaining a sufficient flow of long-term credit in those geographical areas and price classes where housing need is greatest. (2) Obtaining acceptable sites and financing for minority housing. (3) Solving the problems of scarcity and increasing cost of developed lots. (4) Holding other construction cost lines against steady upward pressures by labor and some materials and equipment. (5) Living with the frustrating and expensive delays that results from inadequate FHA and VA processing facilities.

LEVITTOWN, PA., grew to 10,000 houses with the addition of 5,900 in 1954 by Levitt & Sons, who plan to build 7,000 more.

While the construction of private homes boomed, new rental units last year fell off both in number started and in percentage of all dwelling units. The reason appears to be that FHA mortgage insurance no longer is effective in encouraging rental housing. As a consequence of a Congressional investigation to determine whether builders have been making "windfall" profits, the 1954 housing act requires builders to certify actual construction costs, and limits the insured mortgage to 80% of those costs for most apartment buildings. This provision is believed to be discouraging new rental construction.

• **New housing law**—In most other ways, however, the National Housing Act of 1954 creates a more favorable climate for homebuilders. Title I continues insurance on home repair and improvement loans with the same maximums as before, but reimbursement is limited to 90% of the loss on any loan. Title II insures 30-year mortgages on new and existing housing up to 95% of the first $9,000 plus 75% of the excess, with a maximum of $20,000 for one and two-family houses. Maximum loan closed in a builder's name is held to 85% of the loan available to the purchaser. Also, a new mortgage insurance program was established for members of the armed forces on active duty more than two years, providing maximum mortgages of 95% of the appraised value up to $17,000. The Defense Department will pay the FHA insurance premiums.

Several important safeguards against profiteering were written into the act. Prior to a sale, the seller or builder must give the buyer a written statement showing the FHA appraised value. The buyer must also be given a warranty that the dwelling is constructed in substantial conformity with the plans and specifications. FHA is given authority to refuse FHA participation to any firm the commissioner determines has knowingly or willfully violated any FHA, VA or other governmental regulation or failed materially to complete any FHA or VA work properly.

The act rechartered the Federal National Mortgage Association to carry out a secondary mortgage market operation, special assistance functions and management and liquidation of FNMA's present portfolio. The U. S. Treasury is getting preferred stock in exchange for FNMA's capital surplus, reserves and earnings. FNMA is issuing common stock in return for nonrefundable capital contributions from each mortgage seller, with a required investment of 3% of the amount of mortgages sold to FNMA.

The 1954 act also established a National Voluntary Mortgage Credit Extension Committee, with regional subcommittees, to obtain the cooperation of private financing institutions in supplying funds for FHA and VA mortgages in regions where funds are short. If an applicant can certify that two local financing organizations have rejected an FHA or VA loan, the regional sub-committee will try to find funds elsewhere.

As important as these provisions in the new housing act are, the ones that may have the most widespread effects are those intended to spur urban rehabilitation. A significant new construction market is shaping up as cities hasten to take advantage of this expanded federal aid. This help includes grants for planning slum clearance, urban redevelopment and urban "renewal" projects as well as special mortgage insurance for construction and rehabilitation of housing in these projects. The new law differs from the old in that it also includes activities aimed at preventing the development of slum and blighted areas.

Municipal agencies engaged in slum

APPLIANCE PARK, constructed by General Electric Co. near Louisville, Ky., now has 3,000,000 sq ft of production area under roof in five buildings.

clearance also were given some additional encouragement last year by the U. S. Supreme Court. Last November, the court ruled that redevelopment agencies could exercise the power of eminent domain to acquire private property, whether substandard or not, to redevelop a properly designated slum or blighted area, even though the property is later to be sold to other private interests.

• **Lease-purchase trend**—Congress last year also passed a law permitting some federal agencies to award lease-purchase contracts for new buildings. Public Buildings Commissioner Peter Strobel said the new law offers "a new avenue for private industry, particularly investors, to supply buildings for government use." In the first year, the General Services Administration and the Post Office Department were permitted to take bids for about $100 million worth of lease-purchase construction.

This act was in line with a general trend evident last year to obtain more buildings with smaller immediate expenditures. Georgia and Pennsylvania, for example, were trying to build more schools to meet current needs by setting up an Authority, financed by sale of bonds, to construct the buildings and lease them to school districts.

• **Billions needed for schools**—The difficulties faced by these two states in meeting their needs for schools is typical of conditions throughout the country. Construction has not been keeping pace with classroom needs, which arise not only from increasing enrollments but also from deterioration and obsolescence of existing buildings. This situation led to President Eisenhower's proposal last month of federal aid to the states for schools.

A study last year indicated that school construction totaling $32 billion is required over the next decade to provide 950,000 new classrooms for elementary and secondary schools—one-third of which represent the current backlog of building needs. Additional funds are needed for repair and rehabilitation work. And still more money is required for construction at colleges. Thus, school construction totalling at least $4 billion is needed annually. Yet, in 1954, school construction, including college buildings, totalled only $2.6 billion.

Meanwhile, adding to school costs, sites are getting larger, school plants are being decentralized and one-story buildings are on the increase. Classrooms, too, are getting larger, with secondary-school rooms nearing the 1,000-sq ft area established in elementary schools. Also, visual, thermal and auditory environments are being improved for comfort and efficiency of occupants. These higher standards, superimposed on the need for close to 100,000 new classrooms annually, make the school building problem one of the most pressing faced by the country at present.

The situation was made more complicated last year by a Supreme Court ruling that segregation in public schools is unconstitutional. Whether this decision will result in a curtailment of school construction in the South or whether it will lead Southern senators to defeat federal aid for schools, only time will tell.

• **More hospitals**—In 1954, a downtrend in hospital construction was reversed, according to the U. S. Public Health Service. New hospitals, additions and conversions under the Hill-Burton Act had reached a peak of $218 million in 1952, but dropped to $140 million in 1953. Last year the total rose to $162 million. USPHS estimates that all hospital construction came to about $575 million last year, about two-thirds of which was for private institutions, and that 1955 figures will be higher.

• **Prospects for nuclear power**—Developments last year improved chances considerably for practical power-generating plants fueled by fissionable materials, which will open a new market for construction. First, there was the Congressional act permitting private industry to develop and operate nuclear power plants. Secondly, acting jointly with the Atomic Energy Commission, the Corps of Engineers let a contract for a transportable nuclear power plant. Thirdly, the AEC selected a private company—the Duquesne Light Co.—to build and operate a plant to produce electric power for utility use. The $45 million plant will be constructed at Shippingport, Pa., with reactors and heat exchangers underground in concrete and steel structures for protection of operating personnel.

Attempts to estimate whether electrical power can be produced economically from fissionable material in the near future have led to the conclusion that only experience with power-producing reactors of various types can provide an answer. Areas of uncertainty in both engineering performance and costs are so large that no amount of paper analysis can indicate what nuclear power actually will cost and which type of reactor of the many that can be used will be best. Probably this is the reason why private industry is being given a chance to build power reactors, and also the explanation of the AEC 5-year civilian power-development program. Estimated at $200 million, the program calls for construction of five power reactors of different but promising types.

• **Trend to thin walls**—While the construction industry last year saw new vistas opened up for expanded volume, it also endeavored, through use of new materials and new techniques, to make the dollar go farther. One of the most significant developments was a strengthening of the trend toward thin curtain walls for tall buildings.

(*Continued on page* 87)

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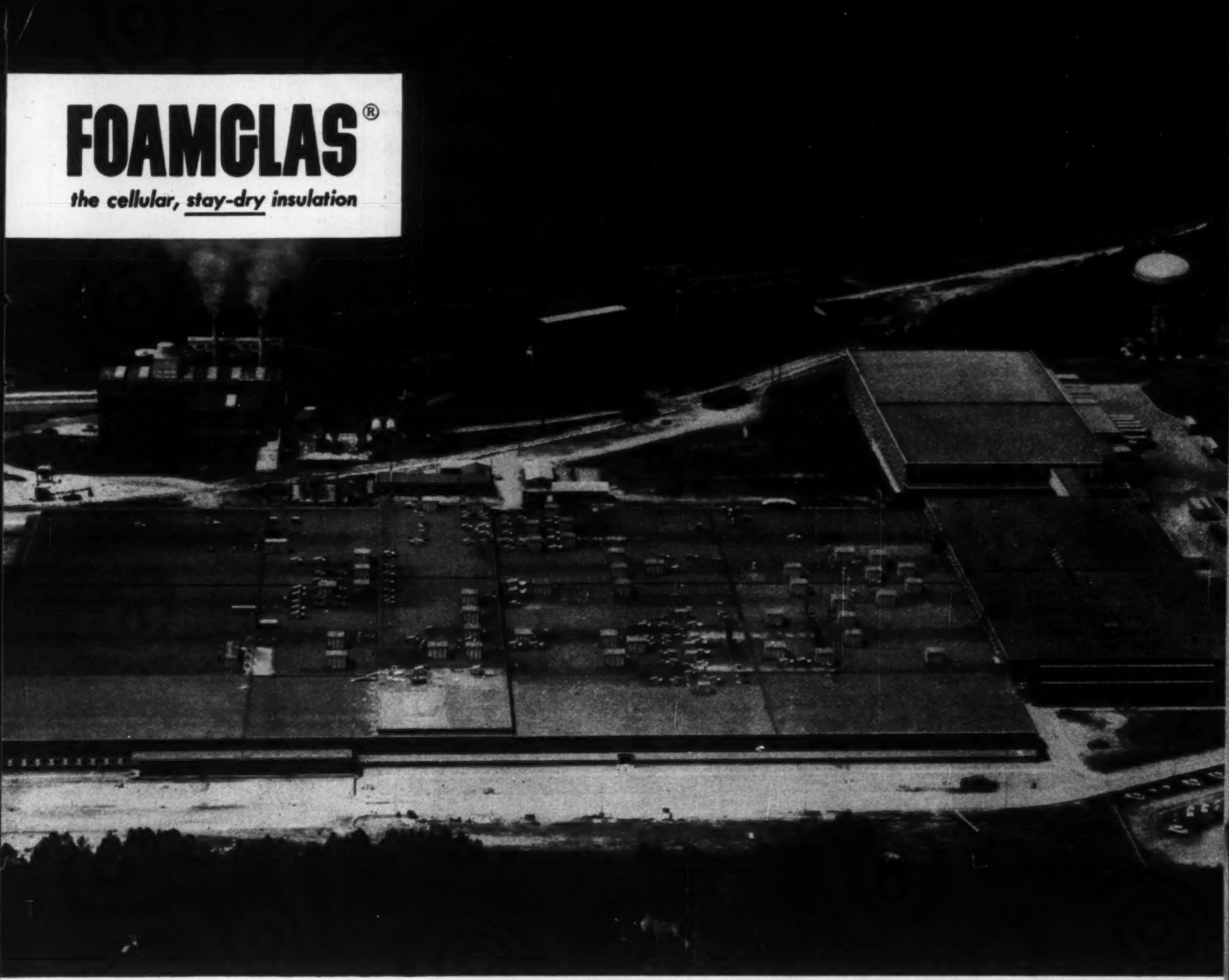

Airview of Grace Bleachery, the world's largest . . . recently enlarged by The Springs Cotton Mills at Grace, S.C. *Engineers and Architects:* Robert & Co. Associates, Inc., Atlanta, Ga.; *Roofers:* Ingold Company, Inc., Hickory, N.C. and Arvett & Ledbetter Roofing and Heating Co., Charlotte, N.C.

On Springs Cotton Mills' 16-acre bleachery roof FOAMGLAS insulates effectively because it stays dry

On this 16-acre roof of their Grace Bleachery, The Springs Cotton Mills has found that FOAMGLAS insulates effectively because it can't absorb moisture and lose insulating efficiency.

Installed in 1947 on the original bleachery roof, FOAMGLAS has effectively kept down condensation on the roof slab and conserved heat in the winter. Seven years later it was picked again to insulate the roof of a major addition to this bleachery, the largest in the world.

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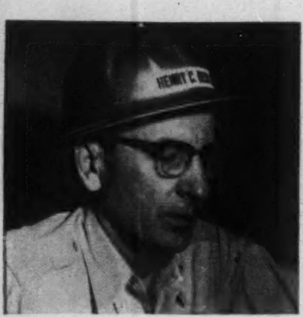


Job Superintendent

FRANK MARONEY says, "Cofar eliminates the need of temporary decking. In only two days 6 men can place a 20,000 sq. ft. Cofar floor. And because placing and welding are quick, Cofar saves on labor costs."

Architect's Representative

AL CADENHEAD says, "Using Cofar not only saves labor and enables us to place concrete faster, it provides a rigid floor deck with minimum of shoring. Cofar also makes a savings of slab reinforcing rods possible."

Contractor's Representative

J. B. HUTCHISON says, "Cofar floors are placed right behind bolting crews *twice* as fast as conventional floors. By eliminating a set of planking, Cofar is a less costly way to construct multi-story buildings."

DESIGN-BUILDER TEAM USES COFAR IN NEW ATLANTA SKYSCRAPER

Saves 11 weeks in pouring and finishing time

Cofar eliminates slow steps in erection, speeds placement of floors, saves $25,000 in temporary shoring alone!

ATLANTA, GEORGIA—Sharply highlighting this Dixie City's booming expansion program, the Fulton National Bank Building today races on schedule toward its mid-1955 completion date. Atlanta's tallest building—rising 25 floors above ground, with 3 more below ground for parking—is also Atlanta's most modern structure. Bulky, expensive wood forms have been completely eliminated through the application of clean, fast Cofar construction!

Cofar deep-corrugated steel units (with transverse wires welded across corrugations) arrive at Atlanta pre-cut to fit the Fulton building frame. Following immediately behind the bolters, construction crews place and weld each 30 sq. ft. Cofar unit into position. Cofar serves as both form and reinforcement for concrete slabs, an immediate unobstructed working platform for plumbing, electrical and other trades, and provides all the positive and temperature-reinforcing steel needed in the structural concrete slab.

Says J. B. Hutchison, vice-president of Henry C. Beck Co., "By eliminating planking, alone, Cofar saves us $25,000 on this job. We place 55,000

ON THE JOB PHOTOS:

Placed In Seconds

Cofar units, conveniently bundled for individual bays, are unloaded at a railroad spur 3 blocks from the Fulton Bldg. Cofar is quickly placed and welded into position, ready *days* ahead of conventional forms for concrete crews to move in and begin pouring the slab.

Eliminates Wood Forms

Once the Cofar is placed it forms a working deck for all trades. The tight lap between sheets holds the wet concrete—result: an ideal incombustible steel form that does double duty. *When the concrete sets the steel becomes positive reinforcement for the slab.*

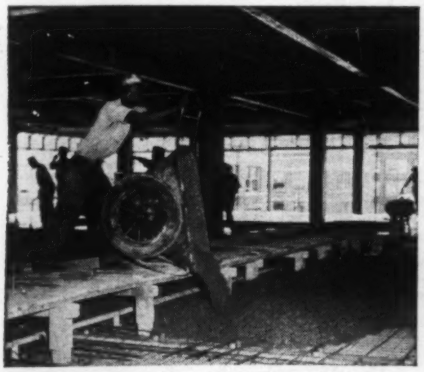
Underfloor Electrical Flexibility

For complete electrical and communications flexibility, underfloor ducts are cast in the structural slab. With outlets every 2 feet along the duct, office equipment and desks always fall over an outlet. Result: complete flexibility, economy but no sacrifice of high strength floors.

The Fulton National Bank Building
Architect-Engineer: *Wyatt C. Hedrick, Dallas, Texas*
Associate Architect: *Moscowitz, Willnen & Millkey, Atlanta, Ga.*
Contractor: *Henry C. Beck Co., Dallas & Atlanta*

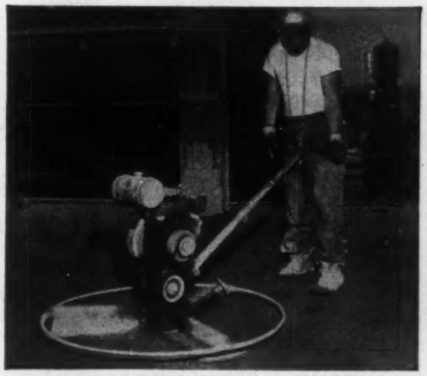
square feet or 2½ floors of Cofar a week. By conventional methods, we'd be lucky to complete a floor a week!"

Cofar makes concrete floor and roof construction a one-stage operation, saves weeks in building time, and insures faster occupancy of the completed building. For information, estimates or costs on *your* building project, contact home or district office, attention Dept. E-1.



16¼ Floors In 37 Days

Despite a 2 month work stoppage, Cofar construction helped make up lost time. After work began again, concrete crews poured 16¼ floors in 37 working days—a gross area of 345,500 sq. ft. It would have taken more than twice as long using conventional forms.



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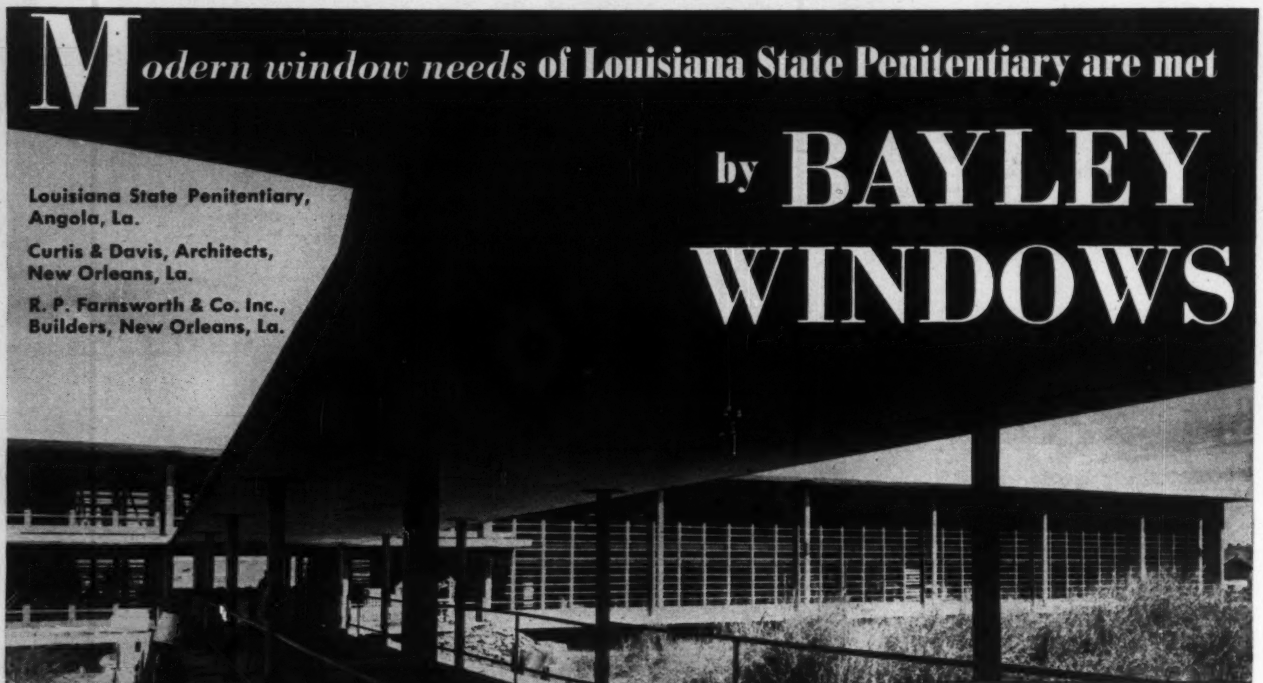
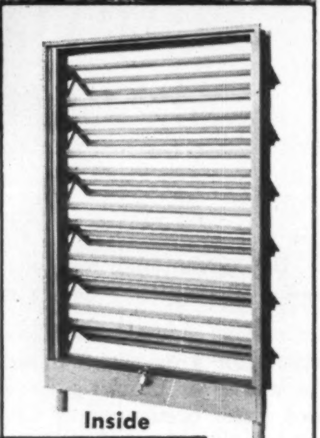


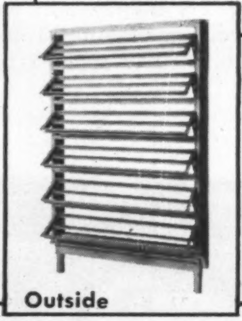
Louisiana State Penitentiary, Angola, La.

Curtis & Davis, Architects, New Orleans, La.

R. P. Farnsworth & Co. Inc., Builders, New Orleans, La.



Inside



Outside

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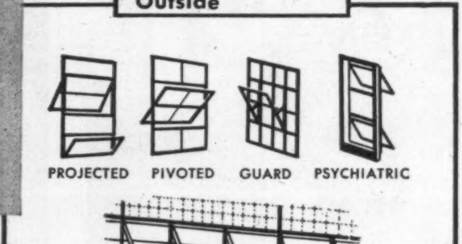

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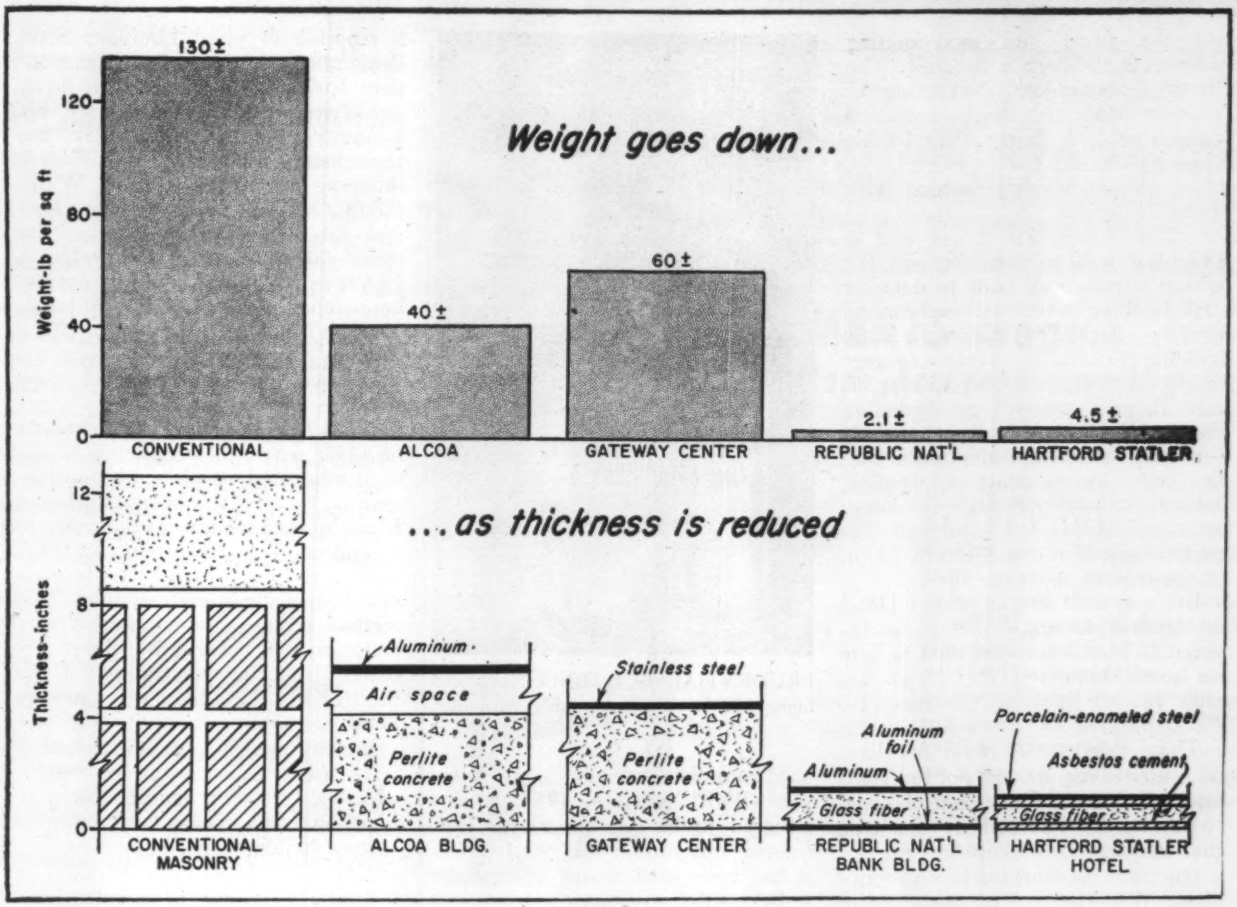


EXTERIOR WALLS for tall buildings become lighter and thinner, as comparison of two 1954 walls (right) with predecessors shows.

Some of the walls erected last year were less than 1½ in. thick and weighed less than 4½ psf. The number of such constructions being used seems to be taking place at a steady rate.

The reasons for this development are not hard to find: Decreasing the thickness of a wall increases the rentable floor area and hence, the rental income. Reducing the weight of a wall enables appreciable savings to be made in the structural framing and foundations around the exterior of the building. In some cases, the thin walls cost less than conventional masonry wall in place, and in most cases, maintenance costs for the light walls are expected to be less. Another important factor is that they can be erected speedily.

Chief block to thin curtain walls until recently was high initial cost. After World War II, however, a combination of rising costs for masonry construction and a decrease in cost for metal or precast-concrete sandwich panels made a switch to the new type walls worth considering from an economic point of view.

Next barrier of importance was, and in many cities still is, local building-code requirements. Again, after World War II, sufficient, though slight, changes in building codes were made in several cities to permit some reduction in wall thicknesses and some use of new materials—enough to allow the trend to get started. Another factor tending to encourage the trend is the technological improvement that has been made in panel-wall construction in recent years.

The trend to thin walls for tall buildings appears to have received its greatest impetus from the erection of several metal-faced buildings in Pittsburgh one in aluminum, four in stainless steel in 1951 and 1952 (ENR Feb. 22, 1951, p 40; April 3, 1952, p 67; April 24, 1952, p 67). The panels used here were all one story high, but the following year the Tishman Realty and Construction Co. tried two-story panels for a 26-story building in New York City, with startling success. Only 1,366 man-hours were expended in covering 98,363 sq ft of building with 130 tons of aluminum (ENR August 13, 1953, p. 43). Last year, Tishman followed up with an even more spectacular demonstration of the speed of enclosure that can be attained with two-story prefabricated panels. The firm covered two street sides of the 22-story skyscraper at 460 Park Ave., New York City, in less than ten hours (ENR July 1, 1954, p. 23). Behind the aluminum panels a 4-in. cinder-concrete backup and ¾ in. of insulation were set in place later. The backup is needed to meet fire-resistance requirements of the city building code.

- **Trend to short panels**—Despite the success achieved with two-story panels, the trend at present, judging from buildings now under construction, is toward shorter panels. Several wall fabricators argue that panels that one man can handle offer adequate possibilities for speedy erection and at less cost.

One example of an application of this technique is the building at 112 West 34th St., New York City. To form the facade, aluminum mullions were placed in a continuous vertical line on the outside at 4½ ft c-c. They form slots that hold aluminum spandrel panels and window sash. As the mullions were placed one on top of another, first a panel, then the window sash were slid into position (ENR June 17, 1954, p. 23).

Warping of the aluminum spandrel panels, which is an objectionable characteristic from the standpoint of appearance of most light-gage wall constructions, is prevented in these panels by building a slightly curved surface into the panel and incorporating stiffeners at the back of the unit. The effects of expansion, contraction or "canning" only change the curvature of the panel and are unnoticeable. To disguise these effects on previous jobs, light-gage panels were formed with depressed designs.

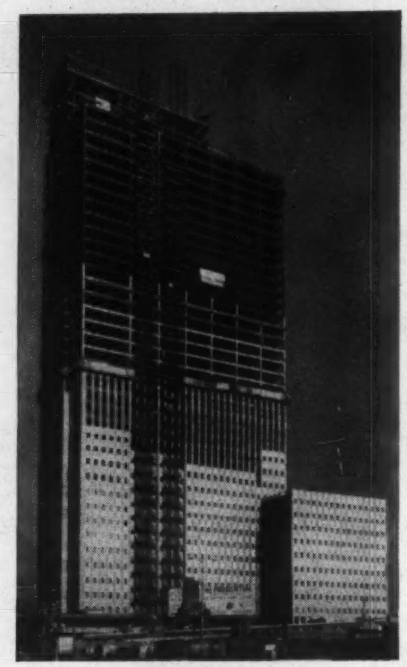
• Lightest wall to date—Perhaps the lightest curtain wall built to date for a tall building is the one used for the 36-story Republic National Bank Building in Dallas, Texas. Average weight of wall, excluding glazing, is only about 2 psf—4.5 psf including glazing. The bank wall consists of ⅛-in.-thick, story-high aluminum panels, each incorporating a window, backed up with glass-fiber insulation and an aluminum-foil vapor seal. Total thickness of this wall is only 1½ in. (ENR July 15, 1954, p. 30).

Exterior walls of the Statler Hotel in Hartford, Conn., however, are believed to be the thinnest used to date for a tall building. The panels are only 1¼ in. thick (ENR June 10, 1954, p. 31).

These thin panels could not have been used if requirements of the Hartford building code had been observed to the letter. The code is of a type that requires a backup for fire resistance but contains the inconsistency glass. Weighing 4.5 psf, they are of glass. A variance therefore was obtained to substitute metal for some of the glass. The panels approved were installed in aluminum sash, like glass. Weighing 4.5 psf, they are of sandwich construction, with a 1-in.-thick glass-fiber insulation core and aluminum-foil vapor seal glued to two facing materials. The interior facing is a flat, ⅛-in.-thick asbestos-cement board. The exterior is a laminate of ⅛-in. asbestos-cement board and a 20-ga steel sheet with a blue-green porcelain-enameled outer surface. Purpose of this laminate is to eliminate "canning" of the facing.

For the same reason, a three piece laminate – 18-ga porcelain-enameled steel, ⅛-in. asbestos-cement and 20-ga steel—was used for the exterior of a 23-story office building in the Mile High Center development, Denver, Colo. (ENR June 24, 1954, p. 32). This structure is also of interest because the architects allowed the air-conditioning system to determine the appearance of the facade. They followed the outline of perimetrical air-conditioning units with light-colored bands and employed dark-colored bands to delineate the structural steel framing, the porcelain-enameled panels being set in sash, like glass.

The trend to panel walls may also be noted in masonry construction. In the Chicago area, a company developed a prefabricated brick panel last year (ENR March 4, 1954, p. 26). Believed to be economical for load-bearing and curtain-wall construction, it has been used mostly for exterior walls of one-story houses.



PRUDENTIAL BUILDING, 41 stories high, will be Chicago's tallest structure.

• Progress with lift-slab—During 1954, more applications of the lift-slab method of construction appeared to be evident, and an increasing percentage of the jobs were multistory. The method requires casting of floor and roof slabs at ground level, after which they are lifted into place with jacks set atop the columns.

Last year, four contractors combined operations to complete the tallest lift-slab building in the U. S.—a 58-ft-high, five-story addition to Mercy Hospital in Sacramento, Calif. (ENR May 13, 1954, p. 24). This is as high as any buildings that have been erected to date by the method. A 6-story nurses' residence was built in 1953 for the General Hospital at Winnipeg, Man., but it was roofed with steel deck (ENR Nov. 12, 1953, p. 25). In both cases, six reinforced concrete slabs were cast on the ground and jacked into place.

The fastest lifting rate on a lift-slab project to date was registered last year during erection of another five-story building, a dormitory for 2,000 students at Clemson College in South Carolina. A rate of 13 ft per hour was attained in lifting 8,000-sq ft slabs, whereas the customary rate on previous projects was 3 ft per hour (ENR June 3, 1954, p. 23).

The largest lift-slab project to date is reported to be at Louisiana State Penitentiary, Angola, La., where more than 1,000,000 sq ft of slab is being jacked into place. The heaviest lift during 1954 probably was a 500-ton prestressed, waffle-type slab for a shopping center in Spokane, Wash. (ENR Oct. 14, 1954, p. 26). However, this is considerably less than the record 700 tons set in 1952 when a 15,600-sq ft slab was raised for a warehouse-office-building in San Antonio, Texas (ENR Nov. 18, 1954, p. 10).

• Advances in prestressing—A new trend in prestressing concrete beams came to light last year. Until the end of 1953, nearly all prestressed beams were fabricated in place by post-tensioning, the prestress being transferred from the steel tendons to the concrete by end anchors. Since then, an ENR survey revealed, there has been a marked increase in pretensioning. This method requires the placing of concrete in the beam forms after the tendons are stressed; transfer of the prestress to the concrete is through bond.

Pretensioning has several characteristics that U. S. engineers dislike, which led them to ignore it at first: high cost of anchors, limitations on size of tendons, uncertainty of the effects of shrinkage, and restrictions on length and weight of members, because the method favors off-site fabrication in specially equipped plants. In contrast, post-tensioned beams not only lack these undesirable features but have the advantage that tendons can be draped in a vertical curve, thus improving the economy of prestressing by providing uplift forces as well as longitudinal compression. But the end anchorages are expensive.

The trend to pretensioning probably started because the pressure of competition spurred trial of new methods. Several fabricators last year set up permanent plants for pretensioning, seeking to combine the advantages of mass-production precasting with those of prestressing to meet competition (ENR July 22, 1954, p. 63). The trend gained headway because most prestressed structures now under construction require short spans, and pretensioning is more economical than post-tensioning in that range.

Progress also was made last year in design and construction with prestressed block beams composed of machine-made concrete block (ENR April 22, 1954, p. 32). The most important design improvement was an inexpensive method for establishing continuity. As employed for a one-story warehouse for the U. S. Air Force at Shelby, Ohio, precast, prestressed members were erected as simply supported beams, then made con-

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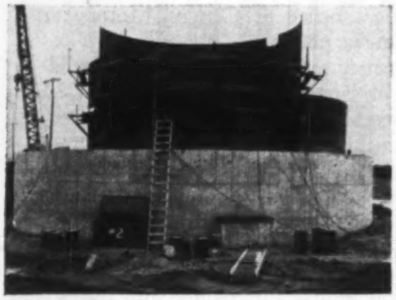

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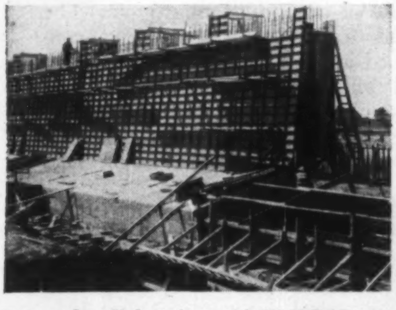

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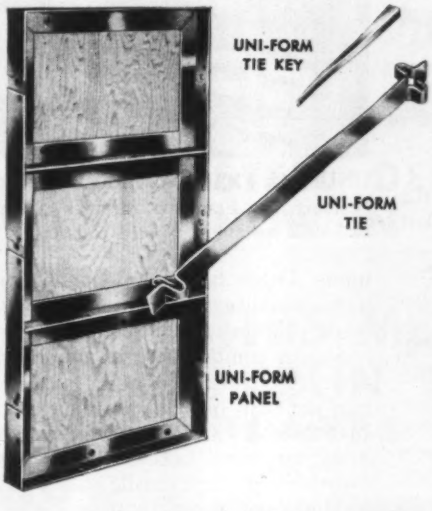

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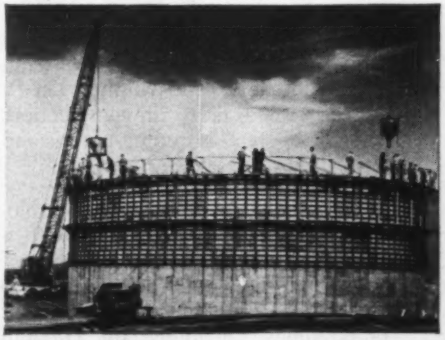

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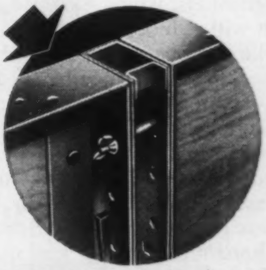

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tinuous with cast-in-place concrete. To resist tensile stresses due to negative bending moments, reinforcing bars were placed on top of the beams at supports and encased in the cast-in-place concrete. As a result, the beams are continuous under live load. Since the continuity steel is simple to place, this method is much cheaper than field prestressing and offers, at low cost, the advantages of continuous construction over simple-beam.

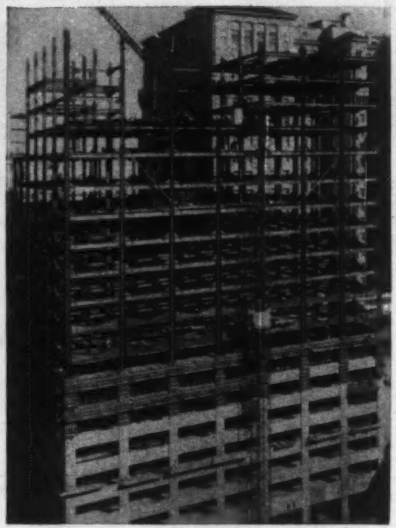
In addition, in 1954, a height record was set for a prestressed concrete building. The new record holder is a 4½-story addition to the Richfield Oil Corp. Building in Los Angeles. Limited headroom and the desire for long-span construction led to the adoption of the prestressed design (ENR Nov. 11, 1954, p. 33).

• Unique steel framing—One of the most unusual buildings erected last year was the 25-story Equitable Life Building in San Francisco. Its steel frame is especially noteworthy because of the method of bracing to resist seismic forces, use of tapered columns, spandrel beams that look like butterflies because they are considerably deeper at the ends than at the middle, and the use of bolts, rivets and welds as connection devices (ENR July 1, 1954, p. 32). Piles for its foundations were driven with the heaviest hammer ever built. A single-acting unit, it had a 17,500-lb ram that traveled 40 in. (ENR May 6, 1954, p. 36).

Because of limitations on depth of floor construction, two types of bracing systems were incorporated, one in the tower, the other in the 16-story base. In the base, concrete floors will carry lateral forces to the exterior columns, which were made big enough to take them. Where shears are greatest, these columns are braced by "butterfly" spandrels, which, because of their depth will reduce the unbraced length of the verticals and the bending stresses in these members. Interior members in the base have simple web connections. In the 10-story tower, beam and girder connections were designed to transmit bending moment. Because of the difference in bracing systems in the two parts of the building, horizontal bracing was placed in the 15th and 16th floors to transmit lateral forces from interior to exterior columns.

Columns up to the 14th story are tapered 3/32 in. per ft. Erected in 3-story lengths, these members were made by joining three plates with continuous welds in the fabricating shop. The taper simplified column splices.

Spandrel beams in the base section were field welded to the exterior columns. Other field beam connections were made with high-tensile bolts, while column splices were riveted.


UNUSUAL FRAMING in Equitable Life Building, San Francisco, includes "butterfly" steel spandrels, tapered columns.

Similar combinations of connecting devices were noted for other tall buildings last year, but it is too soon to say that there is a trend in that direction. Some engineers believe that a combination of high-tensile bolts and welding may prove most economical for field connections in tall buildings, welding being used for wind connections, bolts elsewhere. For low buildings, there appears to be a definite trend toward high-tensile bolts for field connections.

Another unusual example of steel framing last year was the world's largest dome used in a new coliseum at Charlotte, N. C. Spanning 330 ft, it is of welded, radial rib construction. Weight of steel, including purlins and ring girder, averages 22 psf.

• New look at blast design—Explosion of an H-bomb last year, with a release of energy many times that of an A-bomb, compelled engineers to review their thinking on blast design of buildings. Obviously, the H-bomb made dispersal of defense-production facilities more urgent. But it also made more important than ever that buildings and shelters be designed for the fringe area, which has become vastly larger with increase in power of nuclear weapons.

Few engineers are able to make an accurate estimate of the blast resistance of buildings, even if they know the forces and the energy involved, because of the complexity of the problem. However, by following simple rules proposed by Arsham Amirikian, chief designing engineer of the Bureau of Yards and Docks, structural strength and blast resistance can probably be increased as much as 100% at an added cost of only 5% to 10% (ENR April 15, 1954, p. 21). Principal steps include making the main framing, and connections of secondary framing to main framing, rigid or continuous, integrating floor slabs with beams or stringers, building exterior walls with moment and shear-resistant framing or panels, minimizing window and door openings in outer walls, eliminating unreinforced brick and block exteriors, and fastening exterior walls and interior shear walls securely to foundations and horizontal framing. Minimum design standards and criteria also were proposed by the Federal Civil Defense Administration (ENR July 1, 1954, p. 26).

• Lesson taught by bad fire—Practices being adopted by General Motors for its new plants to prevent large-loss fires may set a pattern for other builders of large industrial buildings. GM reviewed its thinking on fire protection following the complete destruction in 1953, within one hour, of its 4-year old, 1,500,000-sq ft transmission plant in Livonia, Mich.

In brief, roofs of new plants will be subdivided and well ventilated, interiors will be subdivided and sprinklered, adequate water supply and hose connections will be assured and contractors will be made responsible for maintaining safe conditions during construction (ENR July 15, 1954, p. 28). Plant management has been advised that roof decks should be of precast concrete or non-metallic noncombustible material when waterproofing materials such as pitch or asphalt are applied. Noncombustible roof insulating materials are to be used, and all joints will be sealed to prevent pitch from dripping in case of a future fire. (Rapid spread of fire in the Livonia plant was attributed to pitch dripping from the roof.)

• Use of air conditioning grows—The trend toward air conditioning continued in 1954. Retail sales rose from $1¾ billion in 1953 to close to $2 billion last year. And Cloud Wampler, president of Carrier Corp., predicts another $250 million boost in sales this year.

The fastest moving segment of the industry is central residential equipment. Sales rose from 50,000 units in 1953 to 75,000 units last year, totaling $100 million. This year 125,000 units may be sold, for a total of $160 million, according to Mr. Wampler. Introduction of improved, waterless, air-cooled units may encourage this trend. Meanwhile, sales of room air conditioners were no

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higher than in 1953—about 900,000 units—for which cooler than normal weather across the nation last summer is blamed.

Gains were made, also, by a relative newcomer—the heat pump. About 1,800 units were installed in 1954, and General Electric, the largest producer, estimates that more than 4,000 will be installed this year.

• More plastics in buildings—Consumption of plastics in construction is estimated to have increased 20% in 1954 over the previous year, reaching to more than 400,000,000 lb. Headway is being made with plastics for piping, conduit, ductwork, vapor seals, insulation and light-transmitting panels. Several structures have been re-roofed with a sprayed-on plastic skin, and a 15-story concrete hotel in Tyler, Texas, was coated on the outside with such a skin, eliminating flashings, copings and calking. Also, studies were made to develop wall panels of laminates and reinforced plastics.

To some extent, plastics may be responsible for the return of skylights on industrial buildings. At mid-century, skylights were seldom considered for new buildings because of unsatisfactory lighting effects, heat losses and maintenance costs. In the last few years, however, introduction of transparent plastic domes into the construction market after successful service on military aircraft led to a rebirth of interest in skylights. An outstanding example is the recently completed U. S. Signal Corps depot at Tobyhanna, Pa., where a warehouse is illuminated through 585 plastic domes.

Major Building Projects

• Equitable Life Building—Steel frame incorporating tapered columns and spandrel beams for a 25-story, $10 million office building in San Francisco was topped out in November. Completion is expected by June. Facing of white marble will be used for lower three floors, aluminum and stainless steel for windows, spandrels and mullions of floors above.

• California State Buildings—Program includes $80 million worth of work now under construction and an additional $56 million in the design stage. Biggest single building under construction is the $7.5 million, 500,000-sq ft Department of Employment Building in Sacramento, which is two blocks long, bridging a street. Other large projects include a $20 million Vacaville medical facility for the Department of Corrections, $11 million Fairview State Hospital for mentally deficient persons and $16 million Porterville mental institution. Much other work is centered at state colleges.

• St. Mary's Square Garage—The $2 million, partly underground parking facility in San Francisco was opened last May. Containing five levels, it has a 1,025-car capacity. Built by private interests, it will revert to the city after the lease expires.

• Pacific Gas & Electric Co.—The $80 million Pittsburg, Calif., steam plant went into operation in December, adding 600,000-kw capacity to the system. A $44 million steam plant at Morro Bay is under construction, with completion of the first 150,000-kw unit slated for completion this summer and the second next year. Plant will use sea water after it has passed through salt water evaporators. Also under construction is a $9 million steam plant of 50,000-kw capacity, at Humboldt Bay, to be completed next year.

• Los Angeles Civic Center—A 10-story, $3.3 million Health Administration Building was dedicated in November. Now under construction, slated for completion in mid-1956, is an 8-story, $6.5 million Police Facilities Building.

• Valley Steam Plant—First units of the Los Angeles Department of Water and Power's $80 million Valley Steam Plant went into operation in 1954 with a 200,000-kw generating capacity. The remaining two units, with a total generating power of 312,000 kw, are scheduled to be finished and in operation before the end of 1955. The Department will start early in 1955 on the first two units of 156,000-kw generating capacity each, of the Scattergood Steam Plant in El Segundo, Calif. Units will have a total cost of $50 million and are scheduled for operation in 1957.

• Southern California Edison Steam—Redondo Beach Steam Station, Calif., was completed in Oct., 1954, at a cost of $25 million. It has one 160,000-kw generating unit. The first section of the El Segundo Steam Station is scheduled for completion this July, and the second late next year. Ultimate capacity will be two 160,000-kw generating units, at a total cost of $46 million. Construction of the first $24 million unit of the Alamitos Steam Station east of Long Beach, Calif., began late last year. Initially, it will have one 160,000-kw unit, scheduled for service late in 1956. Plans call for eventual installation of four such units.

• Hilton Hotel—A $15 million hotel in Beverly Hills, Calif., begun in Sept., 1953, should be finished early this summer. Work is proceeding on interiors of the 450-room, 8-story building. About 100,000 sq ft have been provided for a street-level shopping area.

• Carson Park Mutual Homes—Incorporated as the city of Lakewood, Calif., this housing development has a 72,000 population. A total of 17,300 two and three-bedroom houses in the $10,000 to $12,000 bracket have been completed, of which 1,000 were built in 1954. Construction is under way on 1,100 more, to be completed this summer. With another 54 stores added last year, there are now 84 stores in the 154-acre shopping center. Early this year, construction is to start on a 72-bed portion of a 250-bed hospital and three more churches (bringing the total to 25). Also last year, seven grammar schools and one junior high school were finished, bringing the total to 20 elementary and two junior high schools.

• Anheuser-Busch, Inc. — Extensive use was made of belled-caisson foundations for a $20 million brewery in Van Nuys, Calif., which was completed last June. Novel features of the project included 100-ft-span tapered steel girders and prestressed concrete tanks.

• Jos. Schlitz Brewing Co.—A $20 million brewery in the San Fernando Valley, Calif., will be completed in May. It is the largest steel-frame building on the West Coast completely connected up with high-tensile bolts.

• Mile High Center—A bank and a transportation building in this $15 million Denver, Colo., project will be finished this spring, but the main unit, a 23-story office building, was completed in the latter part of last year. The exterior of this 152x127-ft tower consists of large areas of glass in aluminum sash, interspersed with gray anodized aluminum panels over spandrels and columns. Above the spandrel panels and separated from them by 12-in.-high glass panes are 2-ft-deep panels of eggshell-white porcelain-enameled steel, which cover heating and cooling units. Similar panels are applied vertically to cover air risers.

• Anaconda Aluminum—$60 million aluminum plant near Hungry Horse Dam is now about two thirds complete, with about 1,000 men working on the project this winter. Construction of the project was slowed by a carpenter strike during the summer, which shut down construction from April 6 to June 15. The main plant includes four pot line buildings, 87x1,130 ft and 65 ft high.

• Republic National Bank Building—The exterior wall of this 40-story, $25 million, air-conditioned office building in Dallas

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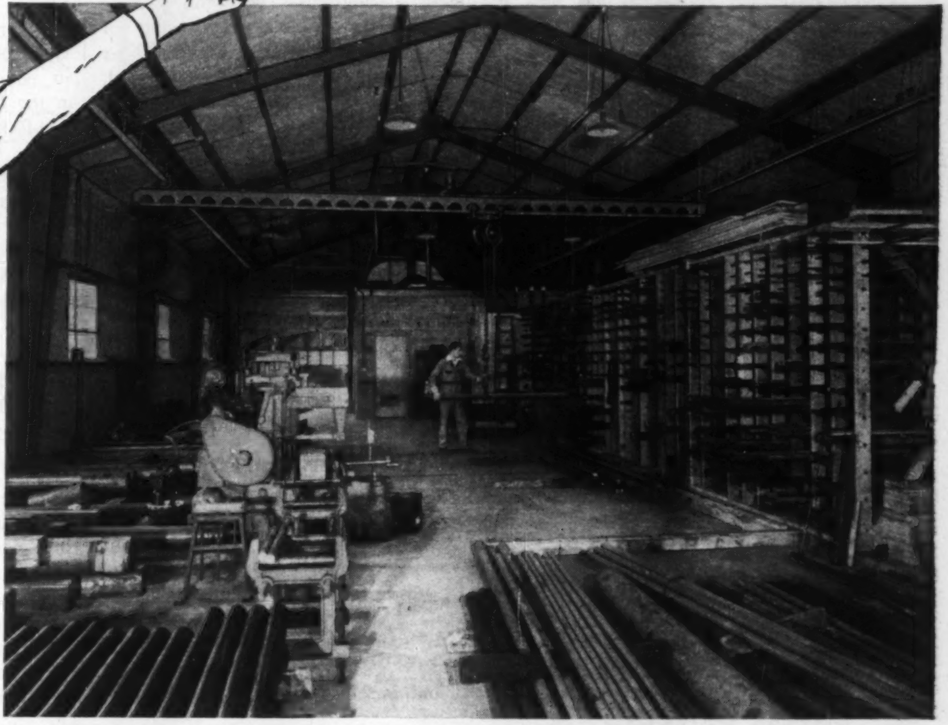

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• **KWTV**—A guyed tower for broadcasting television programs erected in Oklahoma City last year now holds the record as the world's tallest structure. Of steel truss construction, the tower soars to a height of 1,572 ft above the ground, making it 100 ft taller than the Empire State Building, former record holder.

• **Lambert-St. Louis Field**—The $4.5 million terminal building with an unusual roof is nearing completion at the St. Louis, Mo., municipal airport. The roof is composed of three units, each consisting of two interesecting thin-shell reinforced concrete barrel arches, which will have a span of 120 ft and a rise of 32 ft. The shells are 4½ in. thick. The three-level concrete building will be enclosed with glass on the field side and brick on the opposite side. Initially, it will be 438 ft long, but eventually may be double that length.

• **Prudential Building**—The steel frame was topped out in December and exterior walls are being completed for a $40 million office building over 19 tracks of the Illinois Central R.R. in Chicago. Forty-one stories high, it will be Chicago's tallest structure. It will be fully air conditioned and will incorporate elevators with a top speed of 1,400 fpm, fastest installed to date. The exterior is limestone with brick backup and aluminum spandrels with concrete block backup. Aluminum windows will be double-glazed and vertically pivoted, sealed with an inflatable rubber gasket.

• **Detroit Civic Center**—The $22 million City-County building was 80% finished at the close of 1954, and complete occupancy of the 20-story courts unit and the 14-story office unit is anticipated by July 1 of this year. Building No. 3 in the civic center development program—the $4 million Henry & Edsel Ford auditorium—is 50% finished and should be ready for occupancy by the spring of 1956. Designs are being prepared, and foundation work should get started early this year for the Convention-Exhibit building. It will cost about $22 million. Contracts will be awarded early this year for the underground garage of the Henry & Edsel Ford auditorium, and other development work in connection with the civic center, expected to cost about $2 million. Section I of the Detroit River bulkhead has been completed at a cost of $1.2 million and Section II will be finished by April at a cost of $800,000. Also to be finished this year are four contracts totaling $430,000 for the Raw Water Supply station, to furnish water for air conditioning in all of the buildings in the Civic Center, except the Convention-Exhibit building.

• **General Motors**—Last year, the Chevrolet Motor Division added 5,500,000 sq ft of floor area for production—increasing the division's productive area by 25%. Included were additions to 6 manufacturing plants and 7 assembly plants. Chevrolet also had five complete new facilities under construction in 1954. The GM Engineering Center near Detroit—to be completed early this year—has a total of 634,888 sq ft of floor area in three buildings. They are of modular construction finished in glazed white speckled brick, with aluminum sash and with porcelain-enameled columns and gray panels. The three-story administration building has moving stairs between floors, a cafeteria that can accommodate 1,350 persons at a sitting, complete styling studios, blueprint storage, and a first-floor auditorium seating 1,000 persons, with removable seats and a revolving turntable for new model shows. The other two buildings in the Engineering Center are a test laboratory and an engineering shop. Both are one-story buildings.

Chevrolet's four other new plants include: Livonia spring and bumper plant with 814,00 0sq ft of area, and a ventilation system that circulates 1,000,000 cu ft of fresh filtered air through the plant every minute; an engine plant at Flint with more than 1,000,000 sq ft of manufacturing area; an 820,000-sq ft stamping and frame plant also at Flint; and an additional 1,187,000 sq ft of new construction in the Greater Buffalo area for engine production, plus a forge and a foundry.

• **Ford Motor Co.**—Construction got under way last year on two major office buildings in Dearborn, Mich. One is a 12-story steel-frame administration building to house 3,000 central staff employes. With its three-story employee services annex, the air-conditioned structure will contain nearly 1,000,000 sq ft of floor area. Exterior, now being placed, will be aluminum and porcelain-enameled steel panels, and heat-absorbing glass. The other office building, now 50% finished, will be occupied by 2,500 staff personnel of five manufacturing divisions operating in the 1,200-acre Rouge plant. This three-story air-conditioned building, being constructed by the lift-slab method, will have 400,000 sq ft of office space. It will be ready for occupancy late this year. Ford's largest assembly plant, located at Mahwah, N. J. and containing nearly 2,000,-

000 sq ft of floor space will be ready for production this year. The plant will consist of an assembly building, two-story administration building, employees' facilities building, and powerhouse. The main assembly building covers 39 acres, and a double-track rail line will run through its entire length. The new plant will provide separate lines for passenger car and truck assembly. A $26 million plant, with 44 acres under one roof, will be in production next month at Milpitas, Calif., 6 mi north of San Jose.

- **U. S. Army Finance Center**—Located at Ft. Benjamin Harrison, Ind., a 3-story office building, 990x600 ft, with 1,552,000 sq ft of floor area, was completed in April at a cost of $19 million. It includes pedestrian ramps in place of stairways, bus terminal, two large cafeterias and separate central heating plant. Construction is reinforced concrete flat slab, with 6-ft cantilever around the perimeter to allow for continuous sash.

- **Mellon Square Garage**—Now in partial operation, this six-level underground structure will provide parking facilities for 890 cars in the business section of Pittsburgh, Pa. Of reinforced concrete construction, it is 230x260 ft in plan and 60 ft deep. Completion is scheduled for April.

- **Levittown, Pa.**—Starts on new houses last year totalled 5,900. At year's end, more than 10,000 homes were occupied in this 3,600-acre project near U. S. Steel's Fairless Works. Present indications are that the builder will eventually construct about 17,000 houses on this site, plus five shopping centers with 15 major store buildings for 85 tenants.

- **New York Coliseum**—While some demolition and excavation are still going on, foundation work, steel erection and floor concreting are being carried out on other parts of the site for an exhibition hall at Columbus Circle between 58th and 60th St. in New York City. The $35 million building actually will incorporate three buildings in one—a two-level underground parking garage for 650 cars, a 421x340-ft air-conditioned exhibition building, 8 stories high, and a 20-story office building atop the exhibition building. Completion is scheduled for March, 1956.

- **New York City Housing Authority**—Completed in 1954: Van Dyke (Sec. I), Highbridge, Baruch (Sec. I), Mariner's Harbor, Gravesend, St. Nicholas (Sec. III), So. Jamaica (Sec. II), Soundview, Foster (Sec. II) and Brevoort (Sec. I) Houses—ten projects containing 7,193 apartments—at a cost of $154.8 million. Still under way: Bronxdale, Washington (Sec. I), Jefferson (Sec. I), Red Hook Ext., Van Dyke (Sec. II), Hammel, Bre-

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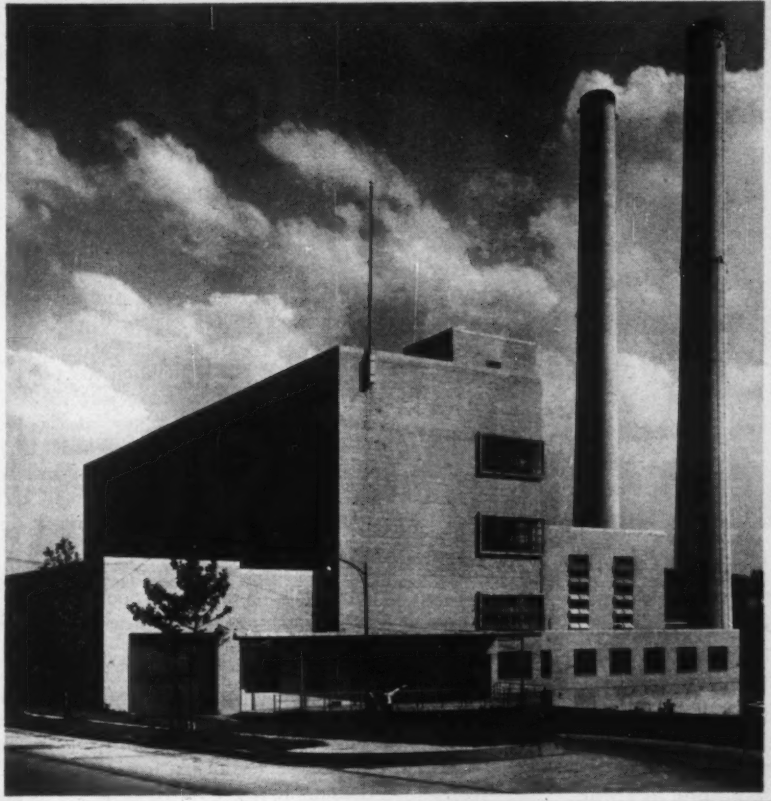

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voort (Sec. II), LaGuardia (Sec. I), Grant (Sec. I), Baruch (Sec. II), Forest, Cypress Hills, Carver (Sec. I), Howard, Sumner (Sec. I), Bay View and Coney Island Houses—17 projects with 14,061 apartments—at a cost of $306.4 million. Some of these projects are major jobs in themselves: General Grant Houses consists of one 13-story building and eight 21-story buildings (probably the tallest built to date with flat-plate reinforced concrete construction or brick cavity walls). Bay View Houses include twenty-three 8-story buildings, also of concrete and brick cavity-wall construction, but with 30-ft-long public balconies on every floor.

• **Socony-Vacuum Building**—Steel is now being erected for a 42-story office building in New York City, which will cost about $45 million. To be enclosed in stainless steel, it will be the world's largest metal-faced building, and its 1,300,000 sq ft of floor area will make it the sixth largest spacewise. It will also be the largest new building to date to be air conditioned. The air-conditioning system will be unusual because it will be a combination compressor and absorption type.

• **20 Broad St.**—Demolition has begun in New York City to make way for a 27-story air-conditioned annex for the New York Stock Exchange. Scheduled for 1956 completion, the new skyscraper will have a rentable area of 500,000 sq ft. Of steel-frame construction, with a granite, brick and aluminum exterior, it will incorporate one-story-high trusses to permit omission of lower floors to provide a 3-story column-free extension of the exchange trading floor.

• **Manhattan State Hospital** — Steel has been erected for the first of 29 buildings in the $40 million reconstruction of an institution for mental patients on Ward's Island, in the East River at New York City. The first unit is a 21-story 1,240-bed Medical-Surgical Building.

• **Grumman Aircraft Engineering Corp.** —An assembly plant with testing facilities for jet aircraft costing about $24 million has been completed at Calverton, N. Y. It includes five buildings enclosed with concrete sandwich panels, fluted aluminum insulated panels and anodized-aluminum sandwich panels. Sealed against the noise of jet aircraft, these structures are air conditioned. The project also includes one 7,000-ft and one 10,000-ft runway, 132,000 sq yd of apron, water supply, sewage disposal facilities and railroad spurs. Runways and taxiways of the new facility are paved with bituminous concrete, while runway ends, test pads, aprons and hard stands are paved with portland cement concrete.

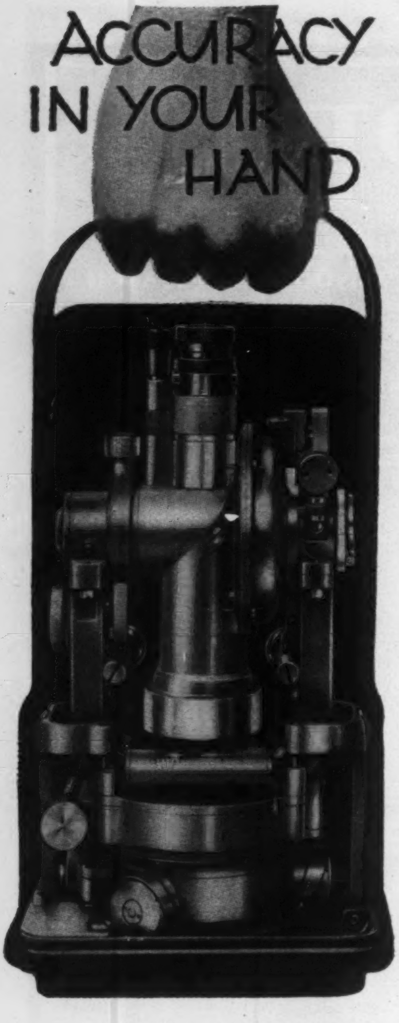
• **Brooklyn Civic Center**—The $3.8 million Domestic Relations Court Building, approaching completion, will soon join the $10.6 million Transportation Building and the $500,000 World War II Memorial dedicated in 1951 on the 56-acre site in Brooklyn, N. Y., of the $80 million civic center. Now under construction in addition are a $750,000 chapter home for the Red Cross, a $2.3 million Welfare Building and a $10.8 million Civil Prison and Remand Shelter. Demolition of a two-block area is making way for a 10-story Supreme Court Building.

• **General Electric Co.**—Five manufacturing buildings, with a total floor area of about 3,000,000 sq ft, have been completed at Appliance Park, the $200 million headquarters for the Major Appliance Division near Louisville, Ky. Construction is still under way on a 2,000x400-ft central warehouse. The steel-frame manufacturing buildings have 40x100-ft bays spanned by 100-ft trusses spaced 20 ft c-c and designed for loads up to 600 psf.

• **Statler Co.**—The 16-story hotel in Hartford, Conn., with exterior walls only 1¼ in. thick, was completed last fall. These walls are sandwich panels with an exterior facing of porcelain-enameled steel. In Dallas,, the structural frame has been completed for an 18-story hotel of cantilevered, flat-plate reinforced concrete construction. Columns spaced 28 ft apart are set back 10 ft from the building face. In plan, the building is similar to an airplane with swept-forward wings. Lateral stiffness and resistance to wind forces are provided by reinforced concrete shear walls at the tips of the "wings" and the end of the "fuselage."

• **Massachusetts Institute of Technology**—Finishing touches are being put to the $1.5 million auditorium with thin-shell tripod-dome concrete roof. One-eighth of a sphere, the roof is supported at only three points, each a ball joint on a heavy abutment. The dome is cut away between these points for segmental window walls. The auditorium will seat about 1,200. Construction is also under way on a chapel of unusual shape, which will seat about 126 and cost $325,000. Surrounded by a moat, the structure will be a brick cylinder with vertical axis. Light from the water will be reflected through arched openings at the base of the cylinder into the chapel, while a circular skylight in the roof will direct a shaft of light onto the altar.

• **Tennessee Valley Authority**—Most of TVA's construction in 1954 was on steam-electric generating plants. The third major steam plant to be built by TVA — Widows Creek — was completed, leaving five still under construction. The



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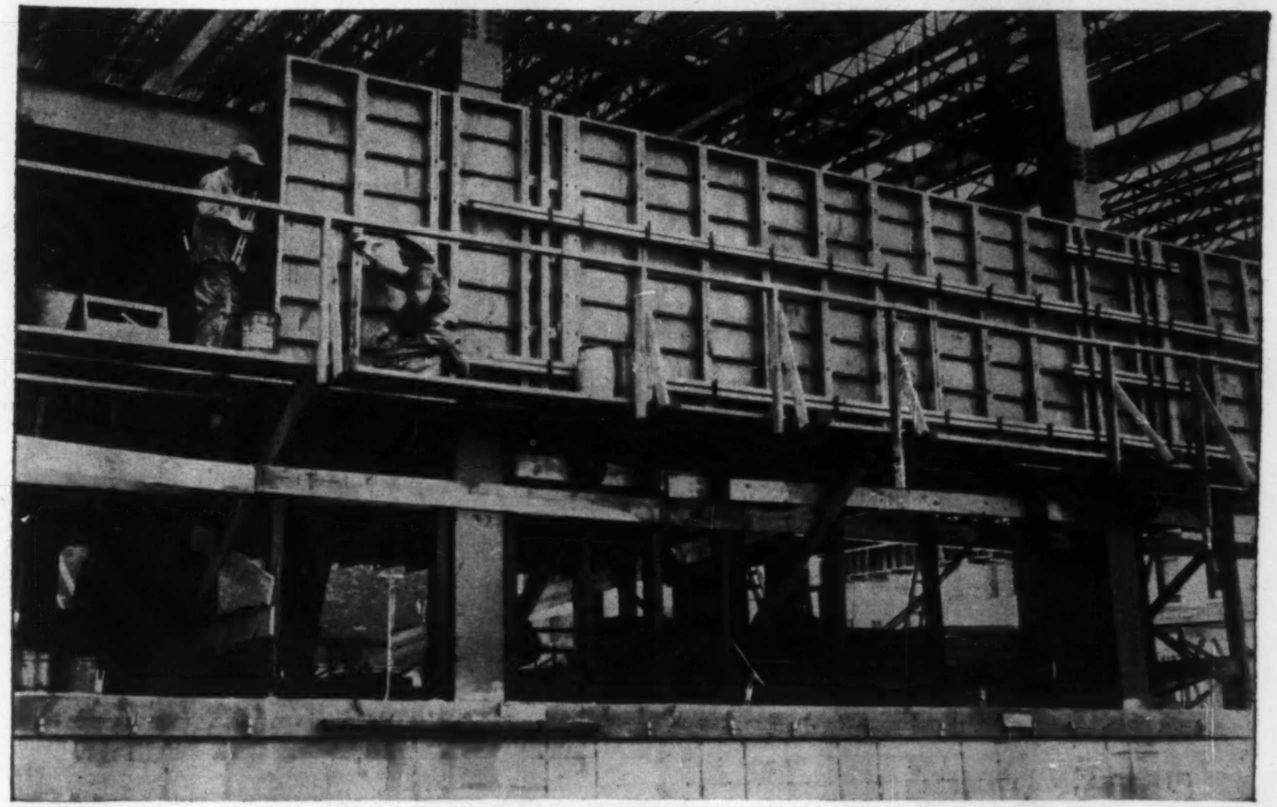
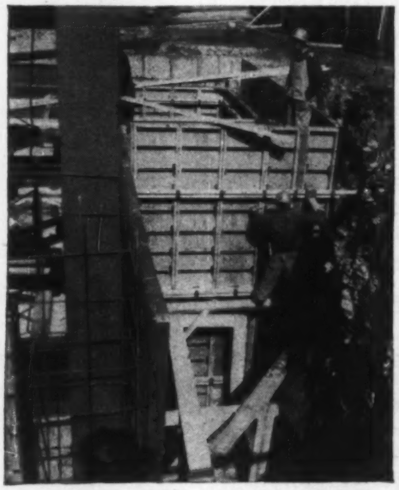


Symons Forms being used for forming Spandrel Beams up to 8½ feet on the Minnesota Mutual Life Insurance building. 9,000 square feet of Symons Forms were reused 12 times on this job. Symons Shores are also visible below. William Baumeister Construction Co., St. Paul, general contractor.

Contractor Cuts Two-Thirds off Forming Costs of Spandrel Beams with Symons Forms

Because of the efficient combination of Symons forming, shoring and scaffolding methods, the contractor was able to cut his estimated cost by two-thirds on the $2,000,000 home office building of the Minnesota Mutual Life Insurance Company of St. Paul, Minnesota.

In addition to savings in labor cost, considerable time was saved in forming the Spandrel Beams of this 9-story building. Sidewalk superintendents looking out of windows of the many surrounding office buildings could see real progress day after day. Forms were walked in place as efficiently as though they were on a footing on the ground. The adaptability of Symons Shores with their safe "T" heads speeded the forming and scaffolding work. The combination of forms, shores and scaffolding was the result of recommendations made by the Symons fieldmen.



All foundation walls are 16 feet in height. Note the use of only three walers.

This is the second of the big, new life insurance structures in the Twin Cities using Symons Forms for the concrete construction. It is the first of its size in St. Paul using a structural steel skeleton with standard and clear span joists, with its decking of corrugated steel sheeting covered by concrete. 2 x 8 ft. Symons Steel Rib Forms were used to frame 56,000 square feet of spandrel beams. Symons Shores were used throughout in beam construction. All foundation walls are 16 feet in height.

Symons Engineering and Customer Service also played an important role in this project. The Symons Engineering Staff furnished complete form layouts and job cost sheets on the form work—at no charge to the contractor. This service enabled the contractor to get a clear picture of his job (its cost, bill of materials and labor saving methods). Symons fieldmen gave regular on-the-job service. First, by on-the-job recommendations of forms and hardware needed. Second, by showing the workmen how to set up the forms efficiently. Third, by being available and giving service on last minute requirements.

View of a spandrel beam after Symons Forms have been removed.

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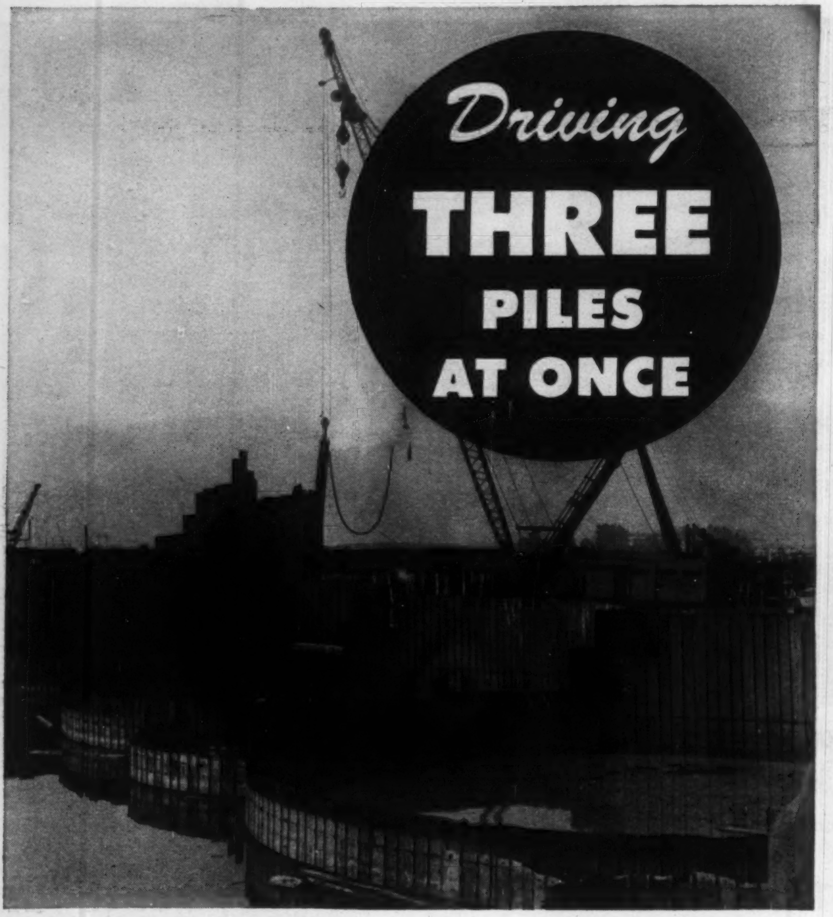

About the most difficult part of the recent pier construction job at the port of Portland, Oregon, was driving the piles of many different types.

Part of the pile driving job consisted of a number of circular cells as shown in the illustration, and for this part of the work McKiernan-Terry 9B3 Double-Acting Pile Hammers were used, freely suspended from crane boom, arranged so that 3 pile sections were driven simultaneously. Consulting Engineer, Frederick R. Harris, New York; Contractor, Guy F. Atkinson Co., San Francisco.

Here, as at construction projects all over the world, McKiernan-Terry Hammers were used to simplify pile driving operations.

McKIERNAN-TERRY CORPORATION
MANUFACTURING ENGINEERS
Also Manufacturers of Coal and Ore Unloaders and Bridges, Grab Buckets, and Special Machinery
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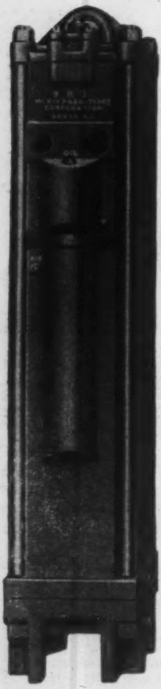


McKiernan-Terry 9B3 Double-Acting Pile Hammer

system has an installed capacity of 7,000,000 kw; by 1957 it will be increased to 10,000,000 kw.

The last two units of the 6-unit Widows Creek plant were placed in operation during 1954. This brought the plant to its total capability of 750,000 kw. Widows Creek is on Guntersville Lake, 5 miles southwest of Bridgeport, Ala. Construction started in 1950 and cost $93 million.

At the Shawnee plant on the south bank of the Ohio River, 13 miles downstream from the mouth of the Tennessee River at Paducah, Ky., seven of the ultimate ten 150,000-kw units are in operation. Construction began in 1951. The plant was about 90% complete at the end of 1954; all units will be in operation next October. Cost is $215 million.

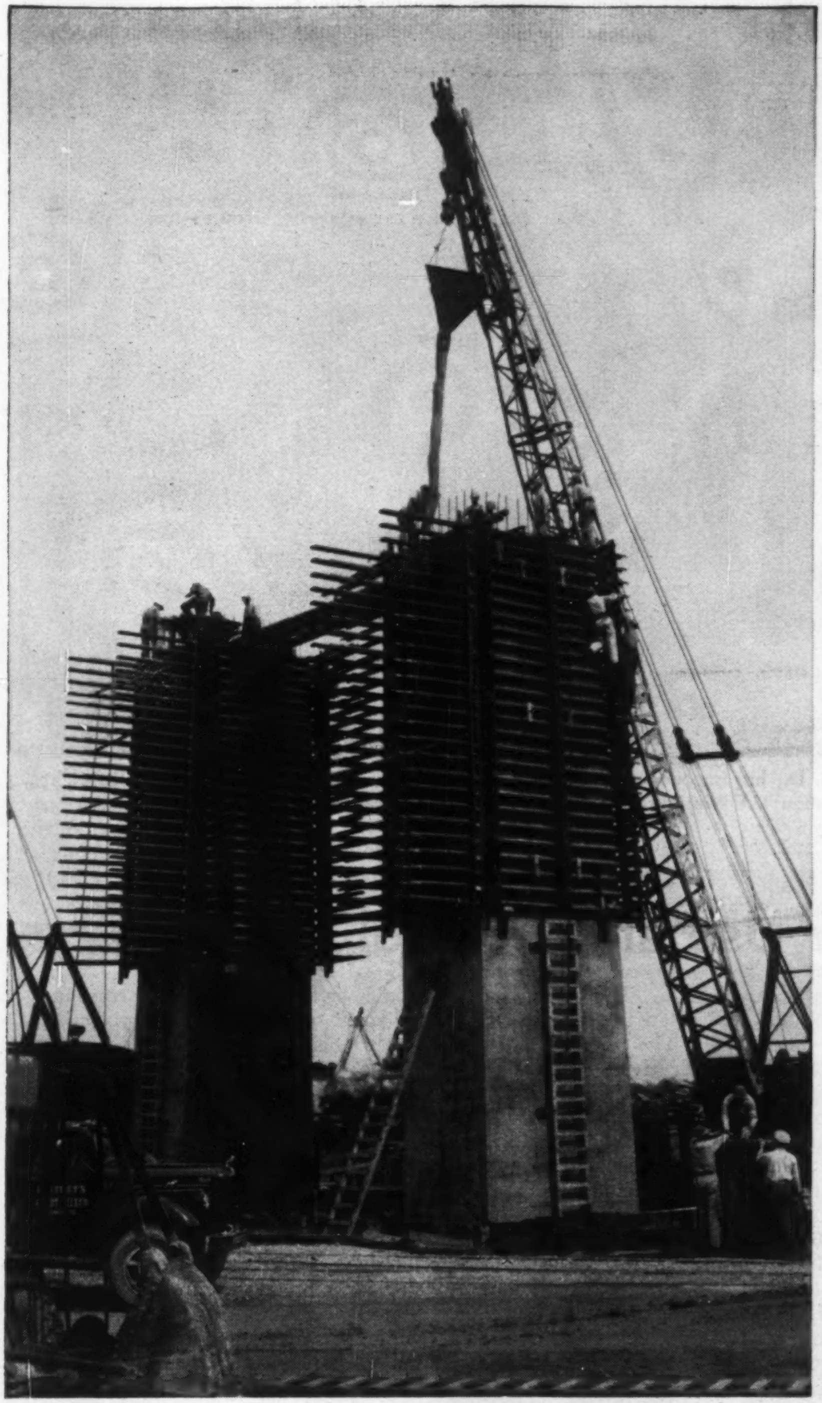
When completed, the Kingston plant on Watts Bar Lake, 2 miles northeast of Kingston, Tenn., probably will be the largest steam-electric plant in the world. Construction started in 1951 and at the end of 1954 was about 80% complete. The first four 150,000-kw units were placed in operation during 1954. Units 5 to 9 will have a capability of 200,000 kw each, giving the 9-unit plant a total capability of 1,600,000 kw—expected to be attained next November. Cost of Kingston is $196 million.

At the Colbert plant on Pickwick Lake, 12 miles southwest of Wilson Dam, Ala., progress on four 200,000-kw units has reached about 60%. This plant was started in 1951; cost is $108 million. All 4 units are expected to be in operation by May.

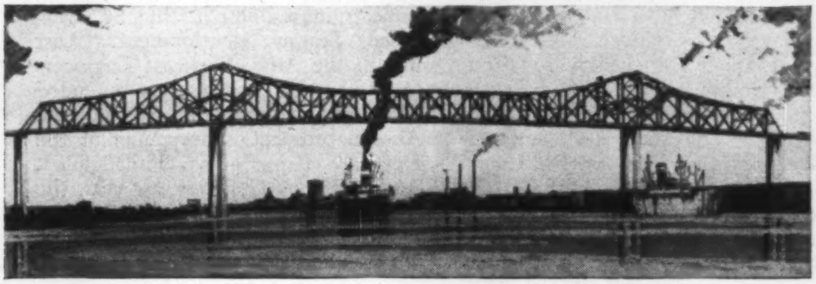
The John Sevier Steam Plant, named for Tennessee's first governor, was about 40% complete at the end of 1954. Under construction are the plant's three 200,000-kw units. Construction of the $94 million plant started in 1952. Unit 1 is to be placed in service in June of this year, and unit 3 early in 1956. The plant is on the Holston River, 60 miles northeast of Knoxville.

Construction at the Gallatin plant began in 1953. The two units being installed—250,000-kw each—will be the largest in the TVA system. The first unit is scheduled for operation in November of this year, and the second in January 1956. Construction was about 20% complete at the end of 1954. The plant is on the Cumberland River (future Old Hickory Lake), 5 miles southeast of Gallatin, Tenn. Cost of the 2-unit plant is $85 million.

• **Hospital Center**—Construction is under way on a $17.5 million project amalgamating three hospitals in Washington, D. C. Included are an 812-bed, 6-story main building, with 603,000 sq ft of floor area, garage, boiler house and nurses' home.



Lowering hopper and elephant trunk pipe for second lift pour.
Below: Main truss span is 710′; has 135′ clearance above mean high water. Merritt-Chapman & Scott Corp., Contrs.



2 up . . .
4 to go

Up to 6 lifts of these 25′ high prefabricated forms were needed to pour the concrete twin-shaft piers for Savannah, Georgia's new high level bridge.

The forms were completely prefabricated, including the reinforcing steel. As three faces of each pier shaft are battered, the forms were altered for each lift by removing pre-cut strips along two of the form faces. Crane booms of 140′ and 168′ length were used for erection and pouring.

Photo at left shows preparations for pouring the second lift of two south pier shafts. As on so much of today's engineered construction the material used here is ready mixed concrete, *processed in truck mixers of certified design, capacity, mixing speed and accuracy of water control.*

4 1/2 CUBIC YARD MIXER
5 CUBIC YARDS
6 1/4 CUBIC YARD AGITATOR

You have a right to insist on this Rating Plate. It certifies compliance with high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

These manufacturers comply with Bureau standards:

BLAW-KNOX EQUIPMENT DIVISION
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CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.
CONSTRUCTION MACHINERY CO.
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IMPERIAL CONSTRUCTION EQUIP. CO.
Melrose Park, Ill.
THE JAEGER MACHINE COMPANY
Columbus, Ohio
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WILLARD CONCRETE MACHINERY CO. LTD.
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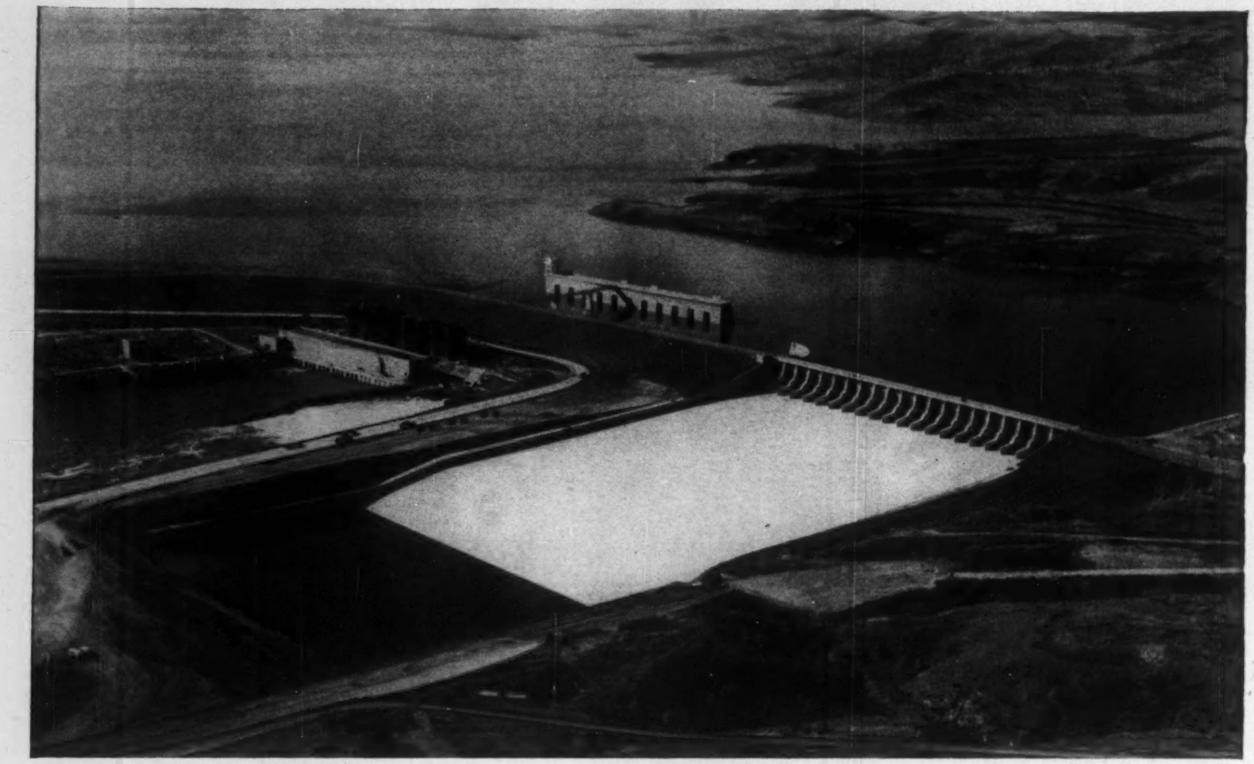
Plainfield, N. J.



FORT RANDALL DAM near Lake Andes, S. D., has impounded 3,100,000 acre-ft of Missouri River waters. Four of its eight 40,000-kw hydro power units went into operation last year; three will go on the line this year, and the last one early next year.

Techniques and Trends . . .

River Use and Control

Now that 1954, a year of low ebb, is past, better times are in store for constructors of dams and waterways. Seeds of the resurgence appeared in words like "partnership," indicating wider participation in regional developments, while water shortages have spurred plans for storage dams—even in the humid areas where previous dams have been focused only on flood control. Biggest single news event in 1954 was initiation of the St. Lawrence Power and Seaway projects, promising four years of high construction activity as well as presaging additional work on channel improvements throughout the Great Lakes region.

Caution nevertheless is found in some parts of the outlook, particularly where international waters are proposed for power use. And reclamationists are at loggerheads with conservationists over a project that could establish an important precedent for encroaching the boundaries of national parks.

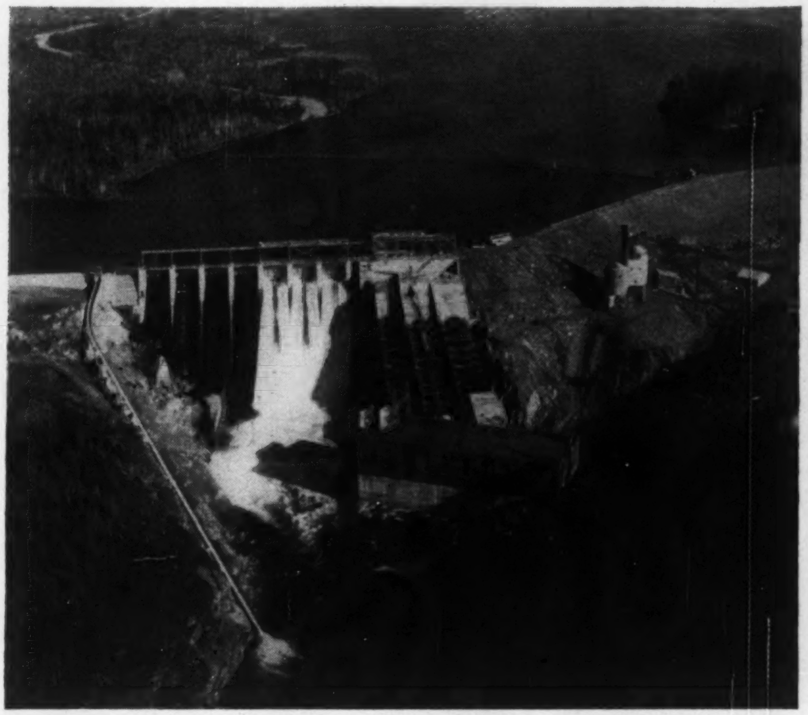
Those who did begin work during 1954, however, found that their dollars could cover the work nicely, thanks to sharp competition among bidders. One list of nine river-control contracts, estimated at a total of $62 million, went for $52.5 million. The list included one bid 33% below the estimate.

• **St. Lawrence River**—Financing for the St. Lawrence River project was accomplished readily in 1954 after the venture was unshackled from the last remaining legal entanglements; construction began immediately. First the power interests, then the seaway (navigation) interests moved into action. Major contracts were let through the latter half of the year for construction of several features of the $600 million power development. First contracts are just now being let for construction of the 27-ft channel of the Seaway project, and the entire job ($105 million authorized) is to be committed by September.

Power potential of the International Rapids of the St. Lawrence is to be developed cooperatively and will be shared equally by the Hydro-Electric Power Commission of Ontario and the New York Power Authority. On the navigation side, work is under the St. Lawrence Seaway Authority in Canada and the St. Lawrence Seaway Development Corporation in the United States. In September it was announced that the Army Corps of Engineers would serve as designing and contracting agent for the U. S. Seaway agency.

Elsewhere in the Northeast some modest private utility waterpower programs moved forward, with no significant new projects in firm prospect. The question of sponsorship for additional power at Niagara Falls, under 1950 treaty provisions, remained unsettled although Niagara Mohawk Power Corp. continued to wage its fight for the right, in the face of mounting pressure for public owneship by New York State Power Authority. Ontario, meanwhile, has nearly completed the intakes, tunnels and power plant that will use the Canadian share of water.

• **Navigation**—Throughout the Great Lakes the construction industry can look forward to channel-deepening projects in response to the St. Lawrence Seaway development. Last month the Army Board of Engineers for Rivers and Harbors recommended $109 million worth of such projects. Also in prospect is deepening of the Delaware River above Philadelphia. Authorized by Congress last year, the $91 million project will be pushed for initial appropriation this year. Somewhat clouding the picture is President



HYDROPOWER in the Northeast continued to expand. This is Indian Pond Dam, completed by the Central Maine Power Co. Capacity, 75,000 kw; cost $17.5 million.

Eisenhower's suggestion that U. S. Steel Corp. pay part of the cost. The corporation wants a 40-ft channel—5 ft deeper than deemed needed otherwise—so super ore-carriers can get to the new Fairless Works, near the upper end of the proposed improvement.

Navigation improvements also got a push in the Ohio Valley, with new locks and dams under way, each to replace two or more smaller locks and lower dams. This could be a 10-year or 20-year program, depending on the rate of appropriation.

• **State pays all**—Another river-use development that was notable during 1954 was state-financing of a flood-control dam. First Fork Dam, in north central Pennsylvania, had been in long-range plans of the U. S. Engineers, but the state decided to go ahead with the $12 million project.

Significance of the Pennsylvania-financed flood-control dam goes beyond the state line because it expresses an independent mood that supports the new principle of "partnership." This principle is designed to foster regional participation in developments that had been swinging toward complete federal sponsorship. The partnership idea has been connected most often with power development, but it applies to flood-control, navigation and irrigation projects.

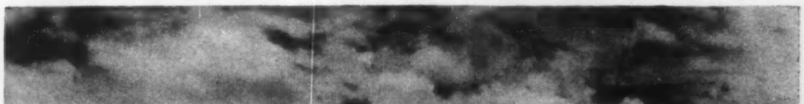
• **Power partnership**—President Eisenhower's partnership program to encourage local participation in the development of power at dams built by the federal government for river-control purposes was given concrete form in legislation passed by Congress last year relating to Priest Rapids Dam on the Columbia River, dams on the Coosa River in Alabama, and Markham Ferry Dam in Oklahoma.

Construction of the entire $360 million project at Priest Rapids by a public utility district or a group of districts under Army Engineer control was authorized by Congress in May. In October the Federal Power Commission gave the Grant County Public Utility District No. 1 a permit to start studies of the project. However, there is no certainty that the district will get an FPC license to build the project as the Washington state government is attempting to designate the construction agency.

The Coosa River legislation suspended an existing authorization for federal development of that river, thus clearing the way for the Alabama Power Company to seek licenses from the Federal Power Commission for construction of five dams for power purposes on that stream.

• **New federal rules**—In part to give effect to the President's belief that resource development is primarily a local responsibility, the Bureau of the Budget has drafted new standards to be used as a guide in determining the extent of federal participation in such work. Also, the new regulations are designed to foster regional development programs instead of piecemeal undertakings.

Under the regulations it will be more difficult than in the past to shift



WATERWAY MODERNIZATION is proceeding on several rivers. Higher dams and locks replace two or more older ones, which are removed. This is blast of Dam "A" on Tennessee's Cumberland River, supplanted by Cheatham Lock and Dam.

CHIEF JOSEPH DAM on Columbia River below Grand Coulee is characterized by riverbank powerhouse and sweeping approach channel excavated from rock. First power in 1955 will add capacity to Pacific Northwest power pool.

most of the cost to the federal government. Stricter requirements for computing benefit-cost ratios have been set up.

• **International power questions**—In October the Kaiser Aluminum and Chemical Corp. announced that it had been granted permission by the provincial government of British Columbia to start engineering studies for a storage dam at the outlet of Lower Arrow Lake, one of two long narrow lakes that form a section of the Columbia River located entirely in Canada. A low dam at the outlet of the lower lake would make possible the storage of 3,000,000 acre-ft of water which could be used to increase the output of power plants downstream by 300,000 to 600,000 kw.

The Kaiser proposal to the government of British Columbia called for paying that government in electric energy in an amount equal to 20% of the increased output of the downstream plants, most of which are owned by the U. S. government.

This Arrow Lakes proposal made the third project on the Columbia River involving international questions to be placed under active consideration. The other two are Libby Dam on the U. S. side of the border and a dam at Mica Creek on the Canadian side. Construction is not imminent, since none of these projects can go beyond the planning stage without approval by the International Joint Commission, and that approval involves questions relating to compensation for property and for new power created by stored water on which no international agreement is in sight.

Another northwest development held up pending specific action is Hell's Canyon on the Snake River, a main tributary of the Columbia. The issue now is being considered by the FPC which should rule in 1955 whether this is to be a public or private undertaking. But don't expect construction to start soon. Any ruling of the FPC will probably be contested, thus adding further delays.

• **Western issues**—The "up-in-the-air" status of international water use and of Hell's Canyon project typified most Western issues in 1954. Here are some of the vital matters still pending settlement of any one of which could unleash projects for construction amounting to many millions of dollars.

The long standing fued between Arizona and California over rights to Colorado River water is still before the U. S. Supreme Court. A decision in favor of either litigant would undoubtedly result in new delaying tactics by the other. But it could also give the green light for construction of new work.

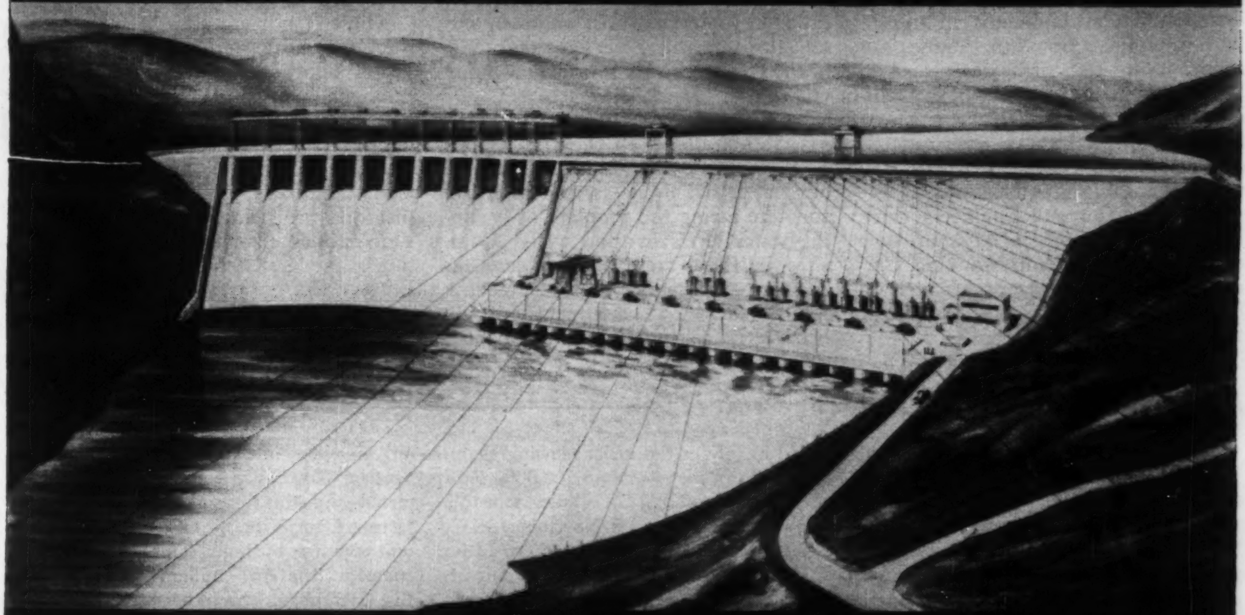
California's state engineers are still studying long-range water programs such as the $1.2 billion Feather River Project. Whether that state will become a major construction agency in the water-use field remains to be seen. Reports due in 1955 should be highly significant.

There is still a possibility that California might do something about purchase of the Central Valley Project from the federal government. Opponents claim money could be better used elsewhere. Supporters say purchase would be on a self-liquidating revenue bond basis. And state ownership, they believe, would clarify an uncertainty now existing—the question of who will own the project after repayment is completed.

Newest and hottest western water controversy concerns the Upper Colorado River Project. The argument in 1954 waged before Congressional committees was on the surface one between "conservationists" and "reclamationists." The former oppose construction of Echo Park Dam in Dinosaur National Monument because they want that park area kept untouched. In spite of the fact that the fossil beds woldn't be harmed, they considered this an opening wedge that might set a precedent for other encroachments on national parks or monuments. Questions of Colorado River Compact interpretation thrown in by California served to confuse the issue further.

This year the Eisenhower administration is undertaking to get the Upper Colorado River storage project authorized to show that the administration is

drilling for 400,000



KW of electricity...

Some 200 miles north of Sao Paulo, Brazil, Ebasco Services is engineering and constructing the Peixoto Hydro Electric Development, for Cia. Paulista de Forca e Luz. When completed, the harnessed waters of the Rio Grande will furnish 400,000 KW of electricity for the industrial development of the area.

To build the dam and accessways to it, meant moving many hundred tons of earth and rock — and for that big job Crucible Hollow Drill Rods were chosen. Experienced construction men *know* they can depend upon these rods for *optimum* performance *at lowest cost per foot of hole drilled.*

That's because Crucible Hollow Drill Rods are built to *tool steel* standards, by the leading producer of tool and special purpose steels. That means fewer broken rods or valuable bits lost on the job. So be sure that on your drilling jobs you specify Crucible Hollow Drill Rods. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

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willing to foster new federal works where the federal government has the primary responsibility and interest.

• **Missouri milestones**—Eastward across the Rockies—the year 1954 saw a number of significant milestones in Missouri River basin program. They involved both construction progress and operational developments of multipurpose projects now functioning. For example, the last earth was placed in the main embankments of both Garrison and Fort Randall Dams. First hydropower production was initiated at Fort Randall, while Garrison will start generating power this year.

With the Corps of Engineers' three main-stem dams on the Missouri now operating—Fort Peck in Montana, Garrison in North Dakota, and Fort Randall in South Dakota—the flood threat in the Missouri flood plain is substantially reduced. Moreover, proof of their value during droughts was also demonstrated last year. Although 1954 gave the poorest water yield since 1941, releases from Fort Peck—supplemented and re-regulated at Garrison and Fort Randall—made it possible to maintain satisfactory flows all the way down the river to St. Louis. Through the critical drought months of last summer and fall, this reservoir water provided 75% of the flow in the Missouri below Sioux City, Iowa.

• **Water shortage**—In the arid regions of the southwestern states, municipal and industrial users—as well as irrigators—are facing the problem of declining water levels in their wells. Damsites in these areas are few and far between—especially those providing low-cost storage. Consequently, it will become increasingly necessary to plan reservoirs primarily to meet water demands for irrigation and municipal and industrial purposes. This will lead to a solution of water control problems on a truly multi-purpose basis, and to a solution of the municipal and industrial supply on a multi-city basis at a lower cost than could be furnished by cities.

These trends are already evident in the Canadian River Project, which will supply additional water for Amarillo, Lubbock, and 9 other cities located on the Texas High Plains. In the Rio Grande Basin, in New Mexico, water supplies are critical, and no unused water is available. While water salvage measures are being developed by the Bureau of Reclamation by channelization of the Rio Grande above Elephant Butte—only by transmountain diversion can new sources of water be developed.

Major River Use and Control Projects

• **Columbia River**—Progress of federal works on the Columbia River system permitted important increments in hydroelectric capacity to be added to the Pacific Northwest power pool. McNary placed three more 70,000-kw generators on the line and was ready with its sixth; Big Cliff added 18,000-kw and Lookout Point the first of three 40,000-kw units. During 1955 the Corps of Engineers projects will place another 50,000 kw of generation on the line. These will come from McNary, Chief Joseph, Lookout Point and Dexter and Albeni Falls.

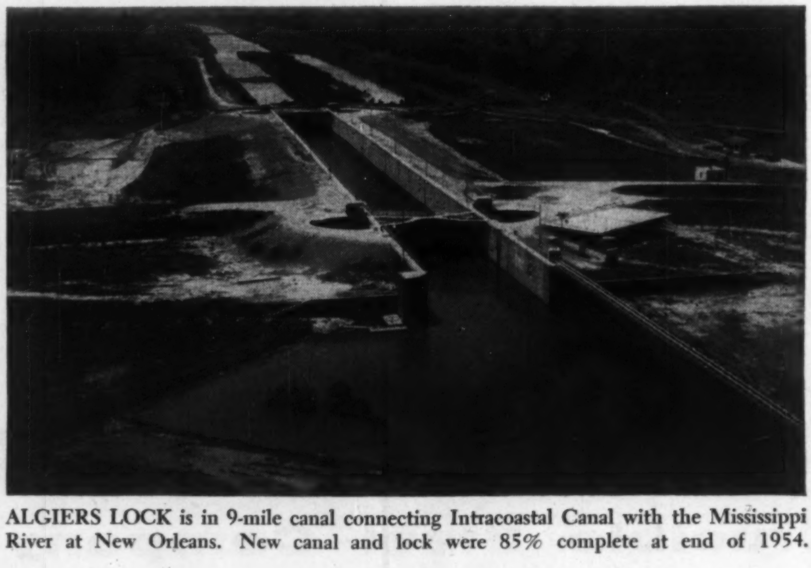
Major project developments saw **Chief Joseph Dam** spilling water over its 205-ft high crest for the first time in December. Spilling put the main dam several months ahead of contract schedule. The 2,040-ft long powerhouse and installation of the first 16 penstocks were completed by end of the year, and installation of the first three 64,000-kw generating units was under way, with all three to be on the line in September. A one-every-three-months schedule calls for the 16-unit installation totalling 1,024,000 kw to be complete by the end of 1958.

The Dalles Dam and powerhouse substructure rose dramatically from bedrock during the year, and contracts for two major phases of the $303 million structure in the Columbia gorge were awarded. These phases are slated for completion in December, 1955. A $13 million contract for the navigation lock and fish ladder and non-overflow dam section at the right abutment was awarded in September. The lock chamber will be in rock excavation and construction will be in the dry. Another $13 million contract covering the concrete non-overflow dam section and the superstructure of the powerhouse for 14 units was awarded in December. Closure of the river, for which bids will be called in July, is the major remaining contract. The work involves 3,500,000 cu yd of underwater fill. The Dalles schedule calls for initial power in November, 1957.

At **Albeni Falls Dam** in northern Idaho the powerhouse was completed in August, and installation of three 14,200-kw generators is progressing. First operation is slated for April. By late 1955 this $31 million multipurpose project will be completed.

In Oregon's Willamette Basin, where the Corps of Engineers proposes 19 dams, **Lookout Point** dam on the middle fork of the Willamette was completed during the year. The first of three 40,000-kw generators went on the line in December and the others will be ready by July. The fifth project of the basin program, Lookout Point and its reregulating **Dexter Dam**, cost $89 million. Dexter was completed by December and will place 15,000 kw on the line in April. On the North Santiam River, **Big Cliff Dam** was completed and this reregulating unit below Detroit Dam is due to have an 18,000-kw unit spinning by June. This will virtually complete the $63 million Detroit and Big Cliff phase. No other structures are under construction in the Willamette group.

Initial studies and surveys were also conducted at **Priest Rapids** site on the main Columbia, between McNary and Rock Island in Washington, and for **Libby Dam** on the Kootenai River in northwestern Montana. Priest Rapids has been authorized as a partnership project and Libby is primarily a storage structure that involves negotiations with Canada. The Corps of Engineers reports completion of studies with other federal agencies on proposals for private dams on Canadian tributaries of the Columbia



ALGIERS LOCK is in 9-mile canal connecting Intracoastal Canal with the Mississippi River at New Orleans. New canal and lock were 85% complete at end of 1954.

Which Armco Culvert is 48 Years Old?

These recent photos won't give away the secret. In fact, you can't tell the age of an Armco culvert just by looking at it. Armco Corrugated Metal Drainage Structures have an outstanding record for long, economical and efficient service.

Just for the record, the twin culverts (1) were installed in 1907. They are still giving good service today — even though two floods completely washed away the road over them. The MULTI-PLATE Pipe (2) was installed in 1932; the Michigan installation (3) has been in service since 1915; the PAVED-INVERT Pipe (4) since 1929. How close did you guess?

1. **OHIO. Twin installation of Armco Pipe serves a busy road between Cincinnati and Dayton, Ohio.**

2. **NEW YORK. This 75" diameter Armco MULTI-PLATE Pipe still has good alignment.**

3. **MICHIGAN. Although this 84" diameter Armco Pipe supports part of the cracked headwall, it gives good service.**

4. **WEST VIRGINIA. To handle highly erosive drainage under Route 7, they installed this Armco PAVED-INVERT Pipe.**

Long life is not the only advantage of Armco culverts. Corrugated metal design provides ample strength for any loading condition. Installation goes fast because, depending upon the Armco structure selected, assembly is either a matter of joining 20-foot-long sections with bolted coupling bands or bolting curved and corrugated plates together. Choice of protective coatings and pavements on pipe up to 96" in diameter helps solve problems of severe corrosion or erosion.

Size and capacity needs are easily met with the wide range of Armco Corrugated Metal Structures. A small crew, with no previous experience, can handle the whole installation. Armco Drainage & Metal Products, Inc., 4435 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

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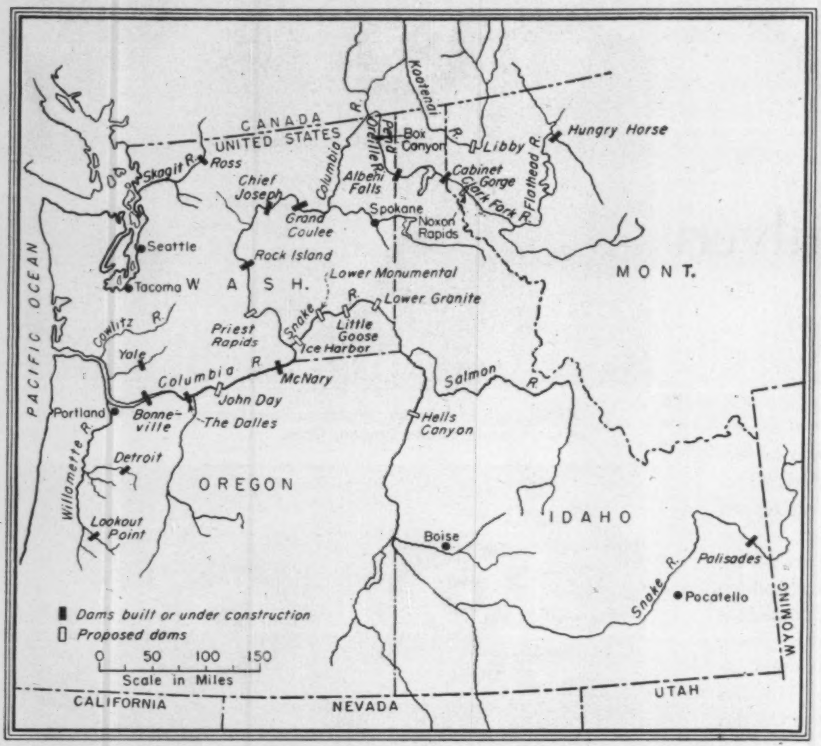
CANADA
UNITED STATES
Skagit R.
Ross
Chief Joseph
Grand Coulee
Columbia R.
Pend Oreille R.
Albeni Falls
Box Canyon
Kootenai R.
Libby
Hungry Horse
Cabinet Gorge
Clark Fork R.
Flathead R.
Spokane
Noxon Rapids
Seattle
Rock Island
Tacoma
WASH.
Lower Monumental
Lower Granite
MONT.
PACIFIC OCEAN
Cowlitz R.
Priest Rapids
Snake R.
Little Goose
Ice Harbor
Yale
Columbia R.
McNary
Salmon R.
Portland
Bonneville
John Day
The Dalles
Hells Canyon
Detroit
OREGON
Willamette R.
Lookout Point
IDAHO
Boise
Palisades
Snake R.
Pocatello
WYOMING
▮ Dams built or under construction
▯ Proposed dams
0 50 100 150
Scale in Miles
CALIFORNIA
NEVADA
UTAH

COLUMBIA RIVER SYSTEM continued to be a major hydro power dambuilding area. Noxon Rapids Dam, a non-federal project, is newest among the proposed projects.

which would result in substantial increments of downstream firm energy.

The only other major federal work in the Columbia Basin is the USBR's **Palisades Dam** in eastern Idaho. Work on this $77 million, 13,800,000-cu yd earthfill dam continued during the year, with major emphasis on fill placement and river diversion. Outlet tunnel lining was completed.

• **Columbia Basin Project**—The USBR's largest irrigation project is continuing to expand irrigated acreage. In 1954 irrigation water was available to 186,000 acres, of which 55,000 acres was new. In 1955 new acreage will total 61,000. The largest 1954 contract was for the fifth section, East Low canal at $2.7 million. Expenditures planned for 1955 total $11 million.

• **Elsewhere in Northwest**—The Seattle, Wash., City Light Department spent nearly $12 million for new construction during 1954, including completion of the initial phase of its **Ross Power Plant,** and plans to spend a little more than that this year. Preliminary work was started for a $15 million diversion dam on the Skagit River in connection with the **Gorge Power Plant.**

Washington Water Power Co. hopes to start construction in July of its proposed $87 million **Noxon Rapids Dam** in northwestern Montana. The concrete and earthfill dam would produce 385,000 kw on the Clark Fork River, 23 miles upstream from the Cabinet Gorge plant. Noxon Rapids would produce its first power in the fall of 1959.

Delayed in 1954 by a contract dispute, the Pend Oreille County, Wash., PUD expects in 1955 to complete its $17.5 million **Box Canyon Dam** on the Pend Oreille River. The power plant, to produce 66,000 kw during normal water periods, was virtually completed and first generators installed during 1954. Work on the spillway was begun in the fall.

• **Northern California**—Public and private agencies continue power, flood control and irrigation development of California's Central Valley. Pacific Gas & Electric Co. has **Pit 4 Powerhouse,** a $25 million, 84,000-kw hydroelectric project, scheduled to go on the line this summer. Plant is part of Pit River system—a Sacramento River tributary—that will cost $155 million if all proposed plants are built.

Southern California Edison Co. completed **Vermilion Dam**—part of the Big Creek-San Joaquin River development—in October, 1954, at cost of $8.6 million. Additional water from the 125,000-acre-ft reservoir is for use in six SCE Big Creek powerhouses.

The Corps of Engineers pushed ahead of schedule on **Folsom Dam** on the American River near Sacramento. At year's end contract for the main dam, designed to store 1,000,000 acre-ft of water and rising 340 ft above river bed, was 95% complete. The main contract sum has grown to $40 million largely resulting from discovery of a fault under the left abutment. The dam includes 1,170,000 cu yd of concrete in the gravity section plus 12,830,000 cu yd of earthfill that has been placed in the wing dams, an auxiliary dam and eight dikes.

Meanwhile, the Bureau of Reclamation advanced its work on the **Folsom Power Plant** and **Nimbus** afterbay dam and power plant. The $11.5 million Nimbus project was nearly 90% complete at the end of the year with power units scheduled to go on the line in March and May. Folsom Power Plant is 86% complete. The Folsom-Nimbus facilities cost will total $40 million. Folsom power units are scheduled to go on line in April, July and October.

The USBR has work almost done on the **Sly Park Project,** a unit of the American River development. Water from this $7.3 million project will be delivered to the El Dorado Irrigation District.

A start was made by the USBR on the **Corning Canal,** first unit of the $57 million Sacramento Valley Canals system that will distribute CVP water to western Sacramento Valley counties.

Work continued on irrigation water distribution systems, stemming from the **Friant-Kern Canal** in the San Joaquin Valley, that will ultimately cost $41 million.

USBR's $47 million **Solano** project has advanced to the 12% completion stage. Key feature is **Monticello Dam** on Putah Creek in Solano County.

Finally, the Corps of Engineers is spending $3.8 million this year on new levee construction and levee repair work on the Sacramento River Flood Control Project. Most of the funds are being spent in the Sacramento Delta.

•**Southern California**—A Corps of Engineers flood control project, **Whittier Narrows Dam,** was brought to 75% completion by the end of 1954. A $3.8 million contract for the central embankment was finished in March, and a $3.5 million contract for the west embarkment and outlet works—begun in March and scheduled for completion in 1956—was well ahead of schedule—65% completed by the end of 1954. Other Corps of Engineers work included the $7.7 million **San Antonio Dam.** The final major contract having begun in March. Totaling $3.4 million, it was not due for completion until 1956, but the dam was expected to be ready for partial use by the arrival of the rainy season late in 1955. And work continued on **Los Angeles River** flood control channel, with two contracts totaling $4.6 million nearing completion at the year's end. On the **Rio Hondo channel,** a $2.5 million contract for channel improvement was completed in April, and a $1.5 million project started the same

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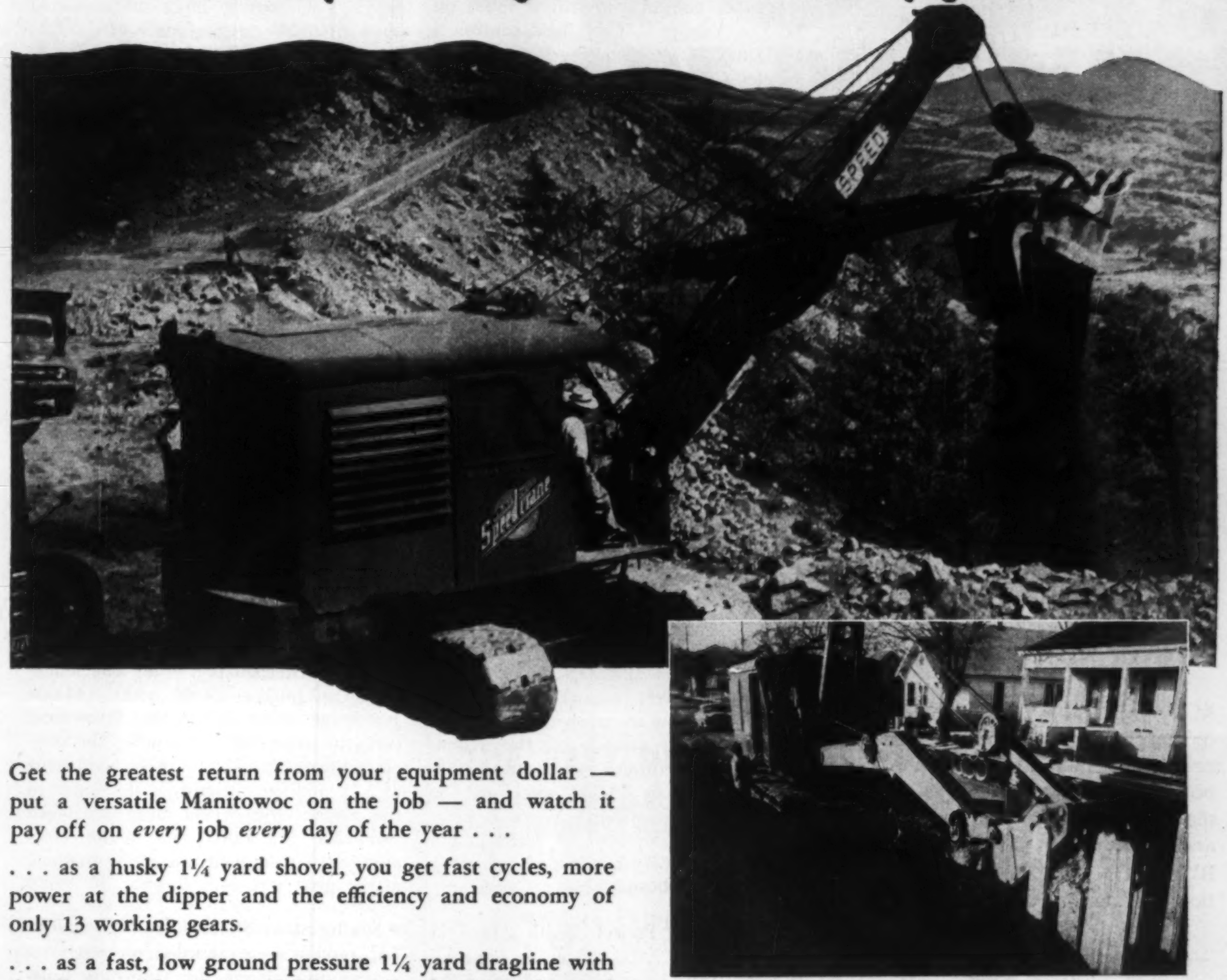

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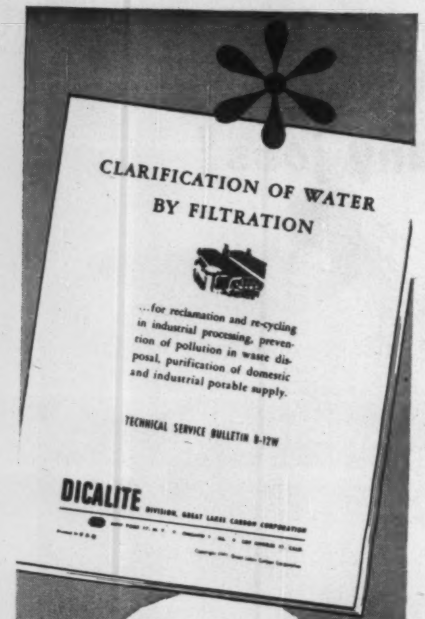

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month was brought to 98% completion during the year. A number of smaller projects brought the total contracts in effect at the end of the year to $17 million. About $194 million had been expended or obligated in federal funds on the Los Angeles County flood control.

Meanwhile, work continued on the **Los Angeles County Flood Control District**'s $179 million storm drain program. In 1954, 16 contracts for $12 million were under way. To date, work on contracts finished or under way amounts to $18 million. Of the total 140 projects scheduled for the program, 16 have been completed since early 1953.

- **Cachuma Project, Calif.**—A water problem conquered, the USBR has completed driving on **Tecolote Tunnel**, a unit of the Cachuma Project near Santa Barbara, Calif. Work was set back for more than a year when tunnelers encountered hot water. Tunnel cost climbed to nearly $13 million as a result. Progress was good on the distribution systems to deliver Cachuma Project water for irrigation and municipal uses.

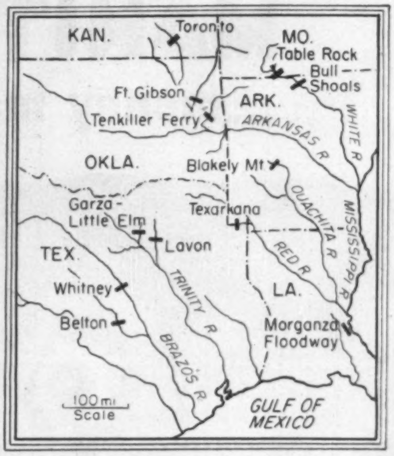
- **Lower Colorado River Basin**—Work on the final unit in Hoover Dam's power plant—a 104,500-kw generator in the Nevada wing—was stagnated due to a dispute over power allocation.

On the Wellton-Mohawk Canal system, 23,700 acres now are receiving water from the canal with enough of the system completed to furnish water to 42,000 acres. Ultimately 75,000 acres will be irrigated by this system. Work is progressing on development of laterals, and additional pumps are being placed along the major Wellton-Mohawk Canal.

- **Weber Basin Project**—Work started in 1954 on the 3,000,000-cu yd earthfill **Wanship Dam**, a principal feature of the $70 million Weber Basin Project— Utah's biggest irrigation operation. Meanwhile, other work continued on this USBR job, with the 3.3-mile **Gateway Tunnel** virtually complete.

- **Colorado-Big Thompson**—This $160 million Bureau of Reclamation project in the Colorado Rockies is complete except for two supply canals, a small power plant and substation alterations. The 17-mi **Boulder Creek** supply canal will be finished by March of this year. One section of the $2.1 million **South Platte** supply canal is finished. Three other sections will be started this year, and the entire project finished in June 1956. The 4,500-kw single unit **Big Thompson Power Plant** and related transmission lines, costing about $1 million, is scheduled to be started next year, and completed in 1959.

- **Texas Panhandle**—Consultants employed by the Canadian River Municipal Water Authority reported last September that the proposed $69 million project to supply Amarillo, Lubbock and 9 other cities in the Texas Panhandle with Canadian River water was feasible. They also recommended a central water purification plant be provided near the proposed **Sanford Dam**, in order that treated water could be pumped to the 11 cities. The consulting engineers confirmed a previous Bureau of Reclamation study concluding that the project would yield 144,000 acre-ft of water per year. Investment concerns interested in financing the project estimate that, based on a bond issue of $73 million, the cost of the water to the project cities would range downward from 22¢ per 1,000 gal. Water bond elections will be held this spring in some of the project cities.



SOUTHWESTERN STATES saw the initiation of two new dams: Table Rock, in Missouri, and Toronto, in Kansas.

- **Southwestern States**—Contracts totaling $42 million were awarded on water resources projects of the Corps of Engineers' in the Southwestern Division last year, and about $10 million of construction was completed. This year an additional $25 million of contracts will be awarded. Principal items will be three floodway projects to cost about $26 million two dam and reservoir projects to cost $98 million; one $13 million local protection project, and emergency bank stabilization work on the Arkansas River.

Dallas Floodway, to cost nearly $4 million is 86% complete and will be finished by June 1958. The $11 million **Oklahoma City Floodway**, also to be finished in 1958, is 22% complete at present. And the **Albuquerque Unit** of the **Rio Grande Floodway** is 14% finished. It is scheduled for completion by June 1957 at a federal cost of $5 million.

Table Rock Dam on the White River in Arkansas and Missouri will cost about $69 million of federal funds. It is only 4% complete at present, and is scheduled to be finished about 1960. It will be a concrete gravity-type structure, 1,600 ft long with two rolled earthfill sections totaling 4,820 ft. Two 50,000-kw hydro power units will be installed initially, with provision for adding two more.

Toronto Dam on the Verdigris River in Kansas is just getting under way, and is scheduled for completion in 1959, at a total cost of $20 million. The $13 million local protection at **Wichita, Kans.**, is 40% finished, and scheduled for completion in June 1958.

• **Missouri River Basin**—Contracts awarded by the Corps of Engineers last year for civil works in the basin totaled $41 million. This year an estimated $53 million are expected to be put under contract. At the end of 1954, about 40% of the authorized river development work of the Corps in the Basin—including work authorized in the 1954 Flood Control Act—was completed. The total estimated cost of the Corps' Missouri River Basin program is $2.5 billion. To date, about $1.8 billion worth of projects are completed or under construction. Here's how construction of the four main-stem dams stood at year's end:

Fort Randall Dam near Lake Andes, S. D., was 88% finished and had impounded 3,100,000 acre-ft of water. It has a total storage capacity of 6,300,000 acre-ft. Four 40,000-kw hydro power units went into service in 1954. Three more will go on the line this year, and the last unit will be put in place early next year.

Garrison Dam in North Dakota, was 80% finished and will be 88% complete by the end of this year. Its 210-ft high rolled fill embankment was topped out last fall and by year's end impoundment of waters of the Big Muddy stood at 1,400,000 acre-ft. The spillway and powerhouse are still under construction, and the spillway stilling basin is yet to be built. The first of its five 80,000-kw hydro power units will be put in operation by this summer.

Oahe Dam near Pierre, S. D.—the least advanced at present, but ultimately to be the biggest workhorse of the four—was only 8% finished, and scheduled to be 15% complete by the end of 1955. Last year a major contract was awarded for flood control tunnels and stilling basin. This year contracts will be awarded for downstream tunnels, control shafts and stage IV earthwork, marking the initiation of construction on the left bank. When completed, the dam will have a storage capacity of 23,600,000 acre-ft and a total hydro power installation of 425,000 kw.

Gavins Point Dam, near Yanktown, is the youngest of the four main-stem dams on the Missouri. It was 44% complete at the end of last year and will

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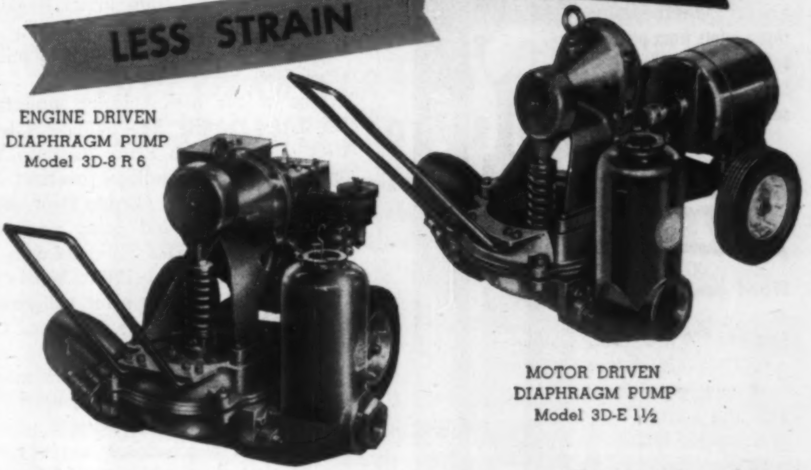

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be advanced to 80% this year. The last major contract at the dam—for construction of the powerhouse superstructure—was awarded last September. Closure of the dam will be made this summer.

Planning is being continued by the Corps of Engineers on the second power plant at **Fort Peck Dam** in Montana, so construction can begin whenever funds are appropriated. Work will continue on **Kansas City's** flood protection project. **Tuttle Creek Dam** in Kansas remains at a standstill because of lack of money.

• **Reclamation's Region 7**—Contracts totaling $27 million are expected to be awarded this year by the Bureau of Reclamation for construction in its Region 7 (Nebraska and parts of Colorado and Wyoming). Last year about $10 million of work was completed.

One of the newest major projects to be started is the $44 million **Glendo Unit** on the North Platte River in Wyoming. A $6.3 million contract was awarded last year for Glendo Dam, power plant foundation and some road construction. The rolled fill earth dam will be 2,100 ft long and 170-ft high above streambed. Its power plant will contain two 13,333-kw generators. **Fremont Canyon Power Plant,** a part of this unit, will be located downstream from existing Pathfinder Dam and will contain two 25,263-kw generators. Completion of Glendo Unit is scheduled for 1961.

Construction was also started last year on the $17 million **Sargent Unit** on the Middle Loup River in Nebraska by awarding contracts for Milburn Diversion Dam and for the first section of Sargent Canal. The completed project will irrigate 17,560 acres of land and have a generating capacity of 4,360 kw.

Other major projects in the Bureau of Reclamation's Region 7 stand as follows: **Kirwin Dam** on the North Fork of the Solomon River in Kansas was 80% finished, and will be completed this year. The entire $19 million irrigation project will be completed in 1958. **Webster Dam** on the South Fork of the Solomon River, costing $6 million, is 25% complete. Construction of the Webster irrigation features will start next year, and the $18 million project is scheduled for completion in 1960. The $70 million **Frenchman-Cambridge Division** on the Republican River in Nebraska was 33% complete. It will serve 68,750 acres of land. The $48 million **Bostwick Division,** also on the Republican River, is 35% complete.

• **Reclamation's Region 6** — The largest construction contract under way in the Bureau of Reclamation's Region 6—which includes the Dakotas and parts of Wyoming and Montana—is the construction of **Pactola Dam** about 20 mi west of Rapid City, S. D. This $4.5 million contract is 65% finished. When completed, the 220 ft high and 1,340 ft long earthfill structure will store 99,000 acre-ft of water for irrigation, as well as flood control and municipal water supply for Rapid City.

The $13 million **Tiber Dam** south of Chester, Mont., is 72% finished, with completion scheduled for Jan. 1, 1956. It will provide water storage to irrigate 127,000 acres of land.

• **Reclamation's Region 5**—The comprehensive plan for the **Middle Rio Grande** will cost about $29 million. Irrigation facilities are scheduled for completion by 1959 and the channel rectification work by 1962. The first 50 mi of channel improvement on the Rio Grande River is practically complete at a cost of $3 million. Work has started on the second unit of channel rectification, which consists of clearing a 600 ft strip through Albuquerque. This is the start of an estimated $7 million expenditure for this work.

About $1.3 million forth of work was completed this year for the construction of three off-stream reservoirs in the $2.7 million **Vermejo Project** for the rehabilitation of existing irrigation facilities serving 7,200 acres of land near Maxwell, New Mexico.

Work has just started on enlarging the spillway capacity of Alamogordo Dam in the **Carlsbad Project,** from 54,000 cfs to 197,000 cfs. The $1.5 million project will be finished early next year.

• **Upper Mississippi River**—Work is under way on two lock projects. An $8 million contract for Stage II construction of the Corps of Engineers' new **Keokuk (Iowa) Lock 19** was awarded in July. It will be 1,200 ft long by 110 ft wide, with a lift of 38 ft at normal pool elevations. The $14 million project, now 25% finished, is scheduled for completion in 1957.

The $10 million **St. Anthony Falls Lower Lock and Dam,** at Minneapolis, is 72% finished. This portion of the project, scheduled for completion next year, includes a new 400-ft long concrete dam with three 56-ft wide tainter gates, and a new 56-ft wide by 400-ft long concrete lock, with a 25-ft lift at normal pool elevations. No federal funds had been appropriated for the upper lock.

• **Lower Mississippi River**—A total of $51 million was spent for levees, bank stabilization and channel improvements during fiscal 1954; about $45 million is available for fiscal 1955. In addition, dams, locks and canals cost $29 million in fiscal 1954, and $28 million is available in fiscal 1955. Improvements brought 20 miles of main levees up to adequate grade and section, and 24 miles of riverbank was revetted.

Memphis Harbor project, has had $10 million of federal funds expended for construction. Total estimated federal cost is

$21 million. By July 1 of this year, about 610 acres of the 960-acre industrial fill will be complete. Development of this industrial area is under way and new terminal facilities have been constructed by oil companies, barge lines and trucking firms. The $11 million **Memphis Flood Control** program is 80% finished. It includes 10 mi of levee, 3 mi of flood wall and 6 pumping stations for sewage and storm drainage. Engineering and design on the **Old River Control Structure** has been carried forward to a point where construction can be initiated on the low-sill structure in fiscal 1956, if funds are provided.

Other active projects include: The $34 million **Texarkana Reservoir** project on the Sulphur River in Texas will be 72% finished by July of this year. **Algiers Lock** and its 9-mile canal connecting the Gulf Intracoastal Waterway with the Mississippi, is 85% finished. The estimated federal cost of the project is $15 million. In the **Tensas River Basin** in Southeastern Arkansas and Northeastern Louisiana, about 284 miles of the 665-miles of required channel improvement, have been completed. All four reservoirs—**Sardis, Arkabulta, Enid and Greneda**—in the Yazoo River basin are now complete.

- **Ohio River Basin**—Civil works projects of the Ohio River Division, U. S. Corps of Engineers were completed in the value of $48.6 million during 1954. Awards totaled $26.6 million, and $6.6 million worth will be initiated during the first six months of 1955.

Old Hickory Lock and Dam, on the Cumberland River 23 miles upstream from Nashville, Tenn. is 63% complete, with an estimated final cost of $49.9 million. The lock, placed in temporary operation last June, has an 84 x 400-ft chamber and a lift of 60 ft. Dam is earthfill and concrete, 3,750 ft long, with six tainter gates. Powerhouse for four 25,000-kw units was started in Feb. 1954, with initial output scheduled March 1956, final March 1957.

Cheatham Lock and Dam, $31.7 million, is about 50% complete. Also on the Cumberland, 42 miles below Nashville, its navigation lock was placed in permanent operation last August, a month after closure of the 495-ft long concrete dam. Lock size is 110 x 800 ft; lift, 30 ft. Power plant construction began in October, aiming at full 36,000-kw output by 1958.

Complete overhaul in two sections of the main Ohio River waterway had begun at year-end. **New Cumberland Locks and Dam,** 54.4 miles downstream from Pittsburgh, by 1959 will impound a 22.7-mi pool and replace three existing locks and dams. To cost $49.8 million, the project will include two parallel chambers 110 x 1,200 ft, with 22.6-ft lift, and a dam 1,310 ft long. In Kentucky, **Greenup Locks and Dam** will replace four main-stream locks and dams as well as one on the Big Sandy

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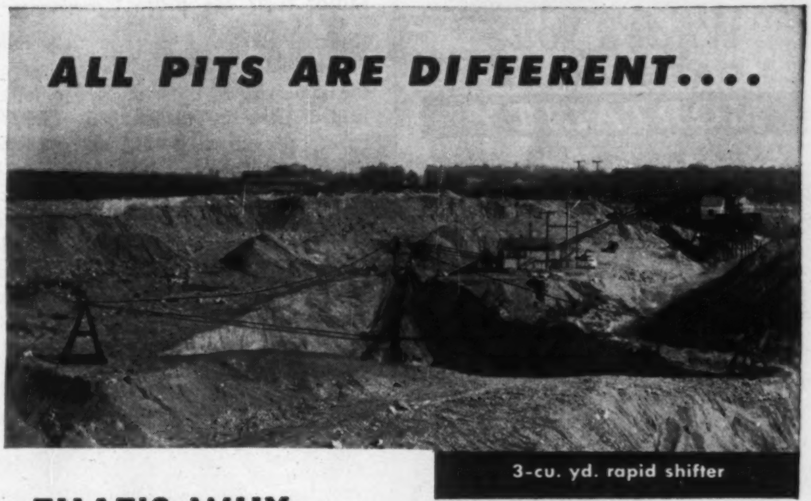

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River. Pool length will be 61.8 miles behind the 1,300-ft long dam; locks are the same size as those at New Cumberland, but the lift will be 32 ft. The $65 million project will be complete in 1960.

Green River Locks and Dams 1 and 2, to cost $10 million, were begun last June and are 20% complete, for spring 1956 operation. They are in Kentucky, 9.1 miles and 63.1 miles above the river's mouth.

In addition to the locks and dams, seven local protection projects were under way at year-end: $29.2 million (including $2.5 million local money) **Louisville** project was 83% complete, toward July 1957 deadline—includes 12.8 miles earth levee, 4.7 miles concrete wall and 14 pumping plants; $7.2 million ($525,000 local) **Maysville,** Ky. project was 60% toward end-of-1955 completion—includes 2.7 miles levee and concrete wall, and 5 pumping stations; $4.5 million ($285,000 local) **Vincennes,** Ind. project was 35% on its way to mid-1957 completion—4.4 miles levee, 0.8 miles concrete wall, five pumping stations; $2.2 million ($450,000 local) **Pineville,** Ky. project 33% complete, target mid-1956; $8.3 million ($765,000 local) **Covington,** Ky. project will be complete this spring—2 miles levees, 0.9 miles concrete wall, 10 pumping plants; $877,000 ($127,000 local) **Johnsonburg,** Pa. project begun in Nov. 1954, for mid-1956 completion; and $1.9 million ($265,000 local) **Barbourville,** Ky. project will be started this spring, for 1957 completion.

• **Tennessee Valley Authority** – Although major TVA emphasis was on steam-electric plants, the authority's twentieth dam—Fort Patrick Henry—was completed. Installation of generating units in two of the remaining three available stalls in existing hydro plants was finished and the third well advanced. New power plants were under construction at two dams—Chatuge and Nottely—during the year, and Chatuge was placed in service in December. **Fort Patrick Henry Dam,** started in 1951, was completed in February 1954 when the second and ultimate 18,000-kw unit was placed in service. At about the same time the power plant at TVA's highest dam, **Fontana,** reached its ultimate capacity of 3 units at 67,500 kw each. In August, **Douglas Dam** reached its full 112,000-kw capacity, while at **Hiwassee Dam** work proceeded, for October, 1955 completion, on the second and final unit, a pump-turbine of 59,500-kw generator capacity and 3900-cfs pumping capacity at 204 ft of head; final generation capacity of the station will be 117,100 kw. **Chatuge's** power house (10,000 kw) was added to the dam, which had been completed in 1942, the same year as **Nottely Dam** was completed. A 15,000-kw powerhouse is under way at the latter, for 1955 operation.

• **Aluminum Company Dams** – High in the Smokies of western North Carolina, Nantahala Power and Light Co. (an Alcoa subsidiary) placed the 10,000-kva **Bear Creek** development in operation last March; nearby **Tennessee Creek** project (12,000 kva) was 85% complete Jan. 1, with power production slated to begin in May. Meanwhile, the Aluminum Company of America has applied for a FPC license to build **Chilhowee** development, westward across the state line in Tennessee. Location is 9 miles below Calderwood Dam, on the Little Tennessee River. Preliminary estimates place the cost at $10 million, including a rockfill and concrete dam 1,410 ft long, and 70,000 hp hydro output at 56.5-ft head. With favorable action on the FPC, application, construction could begin this summer.

• **Southeast** – U. S. Corps of Engineers Mobile District started one and nearly completed another of its four major projects in 1954. **Warrior Lock and Dam,** in Alabama on the Warrior River 50 miles above its confluence with the Tombigbee, was begun in November. To cost $18.2 million, it will replace two old locks and dams. Lock will be 110 x 600 ft, with a 22-ft lift. Downstream 53 miles, on the Tombigbee, **Demopolis Lock and Dam** was 99% complete, the 40-ft lift, 110 x 600-ft lock being put in operation in August. Cost is $20 million.

Jim Woodruff lock, dam and powerhouse on the Fla.-Ga. state line is a $46.4-million project now 80% complete; it is on the Appalachicola River where it is formed by confluence of the Flint and Chattahoochie. Overflow dike, lock and fixed-crest spillway are complete. Progress was made during the year on a gated spillway and powerhouse excavation. **Buford Dam** on the Chattahoochie 35 miles northeast of Atlanta, Ga., is now 34% complete. Earthfill for the 192-ft high main dam began last spring and now is 60% complete. Cost estimate is $40.7 million. The power plant will generate 46,000 kw.

• **Florida Flood Control** – This comprehensive plan for flood control and other purposes in central and southern Florida progressed in 1954 as follows: 19 miles of canals completed; 10 miles of levees; two culverts, two spillways, one pump station and two control structures were completed. To date, Congress has authorized $43.3 million, and $23 million of it has been appropriated for the $200 million-plus project. Local agencies participate in 15% of the cost.

• **Roanoke Rapids Dam** – Construction moved rapidly in 1954 on this Virginia Electric and Power Co. hydro dam in North Carolina near the Virginia line. Rock excavation for a long tailrace was 90% complete (1,200,000 cu yd) Jan. 1, and the concrete dam, 2,965 ft long, was

85% complete. The powerhouse had progressed similarly, with operation of the first of four units expected in July; the last in December. Capacity will be 111,200 kva. Total cost is $34 million.

- **St. Lawrence Power**—Work began in the latter part of 1954 on both the Canadian and U. S. halves of the International Rapids power project—in the vicinity of Massena, N. Y. and Cornwall, Ont. Major U. S. work is on cofferdams for Long Sault Dam, a control structure between the U. S. mainland and Barnhart Island, which is U. S. territory. The first big Canadian contract is for cofferdams to enclose Barnhart Island Power Plant, which will stand astride the boundary between the island and the Canadian mainland. The power plant will have 1,880,000-kw capacity, half owned and operated by each nation's power agency. The project's other major structure, not yet under construction, is Iroquois Dam, for upstream river control 25 miles above Long Sault.

- **Raquette River Dams, N. Y.**—The first of five power dams in a current program of Niagara Mohawk Power Corp. went into commercial service last July. This one was **South Colton (19,350 kw),** the farthest downstream; next upstream, Five Falls (22,500 kw) is ready for turbine and electrical equipment and expected to be in operation in April; Rainbow Falls (22,500 kw) work began in March, 1954, the dam being 40% concreted at year-end, toward a May, 1956 operation date; Blake Falls (14,400 kw) work will begin this spring, for June 1957 completion; and the Stark Falls construction cycle is a year later.

- **Shepaug Dam**—To be the largest hydro development in Connecticut, this Housatonic River project will have a capacity of 42,800 kw. Concreting of the 1,412-ft long, 139-ft high dam is 90% complete, with power production expected next fall. Owner is the Connecticut Light and Power Co. Cost: $10 million.

- **Littleton Development**—New England Electric System, owner of seven of the sixteen existing dams on the Connecticut River, is building another one near Littleton, N. H. Rated at 150,000 kw, it will share top New England size honors with the company's Comerford development, next downstream, built in 1930. Completion of the $45 million earth and concrete structure is expected late this year.

- **Indian Pond Dam**—Rated at half the Littleton capacity, 75,000-kw, $17.5 million Indian Pond development of Central Maine Power Co. was placed in operation last fall. It is 100 miles north of Augusta, on the Kennebec River. The concrete portion is 270 ft long and 175 ft high; earthfill 1,500 ft long. Effective head is 150 ft.

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NEW ELEVATED RAMPS will smooth traffic flow at intersection of San Francisco-Oakland Bay Bridge approach and Eastshore Freeway. Revision of distribution structure to eliminate cross-weaving is costing nearly $5 million.

Techniques and Trends . . .

Transportation

Highway developments and planning dominated the field of transportation in 1954 more than at any time in the past. Even before President Eisenhower announced his plan for a $50 billion expansion of roadbuilding during the next decade, Congress had laid the groundwork for a half-billion dollar expansion of highway construction in the two fiscal years beginning July 1, 1955. In writing a new federal-aid highway act it increased the annual authorization to $875 million, which is an increase of $300 million over the current rate. Much of that increase must be matched by the states on a 50-50 basis.

Congress also took steps to speed up reconstruction of the nation's basic highway network, the 40,000-mile Interstate System. It allocated $175 million of the new money annually to the Interstate System, and it wrote a new formula for distributing half of the $175 million among the states. That half is to be distributed on the basis of population rather than by the traditional formula for distributing federal-aid money, which gives equal weight to population, post-road mileage and area. Under this new plan, more money will go to the populous states, which is where big expenditures on the interstate net are needed most.

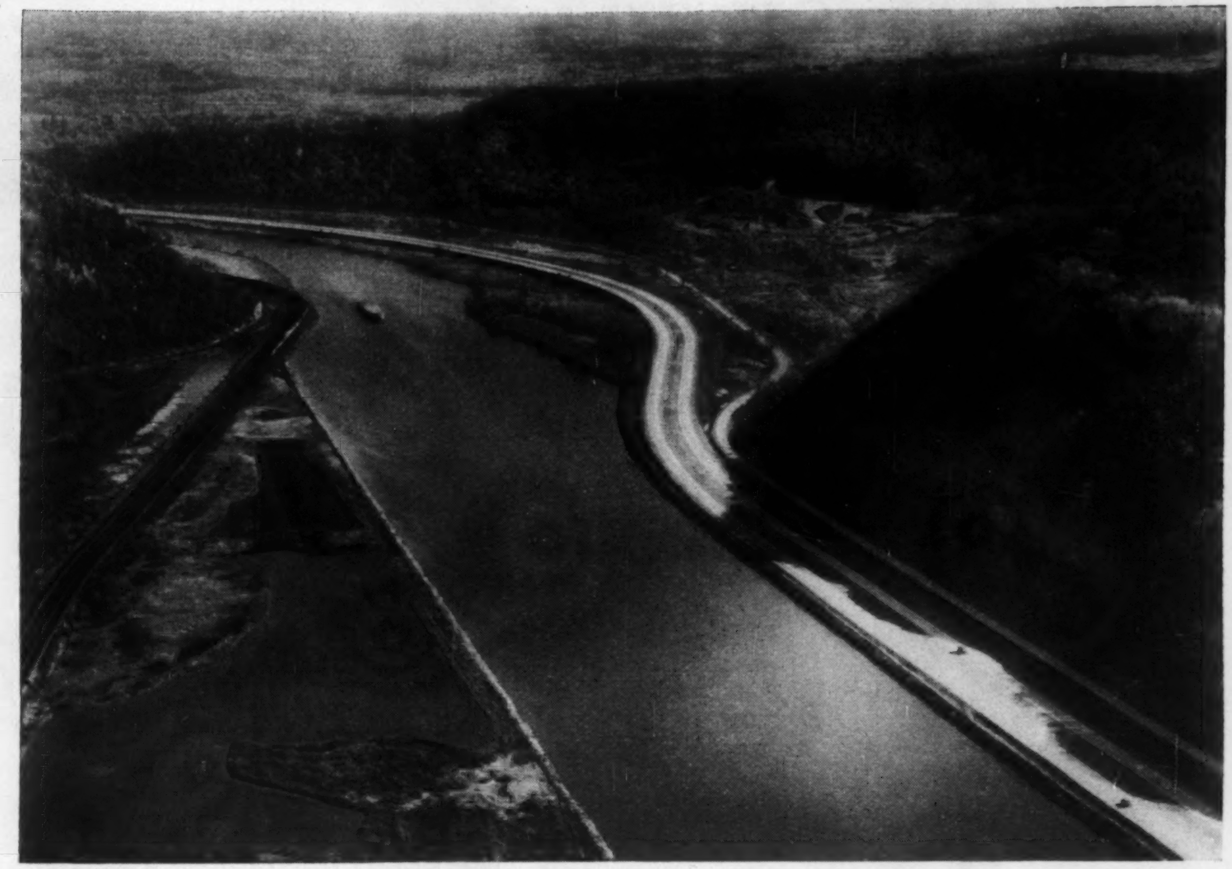
Finally, to encourage the states to concentrate on the Interstate System, Congress set up a new money-matching basis of 40% state-60% federal for work on the interstate system instead of the 50-50 matching required for all other federal-aid projects.

• **President's "Grand Plan"**—All this had been done before the President announced his "Grand Plan" for ending the highway deficiency that threatens to put a check on the whole national economy. His proposal, made to the Conference of Governors in July, was for spending an average of $5 billion a year over the next 10 years for new highway construction in addition to what would be spent under the current highway investment program. Last year that expenditure by all levels of government reached $3.7 billion, the greatest amount in history.

Soon after he made his proposal to the governors, the President appointed a special committee of five business and financial leaders, headed by General Lucius D. Clay, to draft definite proposals to be placed before Congress. They were contained in the special Presidential message of a few weeks ago.

The Clay Committee found that the nation's highways could be brought up to adequate standards by a total expenditure of $54 billion over the next ten years in addition to the $47 billion that is expected to be spent during that time under the current highway-building program. The committee recommended that the federal government should provide $25 billion of the $54 billion and that the states should raise the remaining $29 billion.

Expenditure of the $25 billion in



TO MAKE ROOM FOR THE NEW YORK THRUWAY the canalized Mohawk River near Sprakers was moved to the north (left) and the dredged material was used to make a wide fill on the south side.

federal money should be concentrated on the interstate highway system of about 40,000 miles, the committee said, because that system is essential to the nation's economic welfare and defense. The states would be asked to supply only $2 billion for work on the interstate net, thus making it possible for them to concentrate the funds they raise locally in correcting deficiencies in their state systems.

• **Roadbuilding this year**—Regardless of what action Congress takes on the President's proposal, that action could have little direct effect on roadbuilding expenditures in 1955. Nevertheless, all indicators point to a new record of highway construction this year. Keys to that are the larger federal-aid authorizations for the fiscal year starting in July, the unusually early allocation of new federal-aid funds to the state highway departments, and the steadily mounting income that the states are getting from their gasoline taxes. Also, toll road expenditures will be at a high level again this year.

At the opening of 1954, 1,081 miles of toll highways costing $1.5 billion were under construction. The corresponding figures, now a year later, are 1,242 miles costing $2.2 billion. Three of the four larger projects making up this total are expected to have a sizeable amount of work under contract by summer. They are the Massachusetts East-West Toll Road, the Greenwich-Killingly Expressway in Connecticut and the Indiana East-West Toll Road. Construction work on all of them will continue into 1956.

• **Toll roads in the future**—At the present time, about 3,400 additional miles of toll highways are under consideration by responsible state agencies. Not all of these have been studied to determine whether they will be able to produce sufficient income to be attractive to bankers. Of the ones that have been studied, a few have made favorable showings, but other projects, or sections of them, were found in reports issued last year to lack sufficient income. As an example when Oklahoma offered $214 million in bonds late in the year to finance 321 miles of new toll turnpike construction, the bankers only made offers on the $68 million needed to finance construction of an extension off the Turner Turnpike 89 miles to the Missouri line.

Without doubt this action on the Oklahoma Turnpike Authority bonds was due to conditions in the bond market at that time; but when appraised along with the unfavorable reports on the projects in other states, there is created a feeling that most of the cream has been skimmed from the toll-financing opportunities.

Also, when last year's unfavorable reports on toll-road projects in populous states like Illinois, Ohio, Michigan and Wisconsin are set over against the proposal of the President's highway advisers to have the federal government pay for bringing the whole Interstate System up to adequate standards, it appears possible that many of the toll projects now under study will never be built. Most of them are along routes designated as part of the Interstate net.

This possibility, however, does not preclude the probability that partial toll financing will be used to build many miles of highway through thickly populated areas where costs are very high. Barrier type toll gates, set up at strategic points in such highways, offer a simple way to raise a large part of the cost of such construction.

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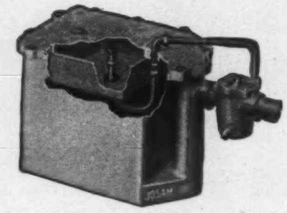

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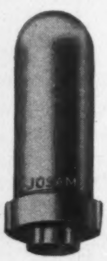

To eliminate the noise and destructive action of water hammer in supply lines.

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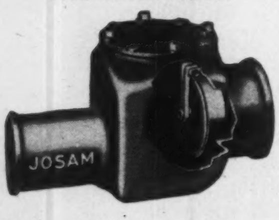

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NEW ENTRANCE TO SAVANNAH. Opened to traffic on Oct. 15, this new high-level bridge over the Savannah River gives motorists from the north direct access to the city in preference to the old crossing farther upstream on U. S. 17. The bridge is 9,776 ft long, with a main-channel cantilever span of 710 ft, 279-ft spans on either side and a total of 50 girder approach spans.

method of financing only requires that some source of revenue other than the tolls can be used to insure payment of interest and principal on the bonds. That can be the general taxing powers of a state or county, or a lien on a state's gasoline-tax revenues.

Balancing the mixed prospect for future toll roads in the east and midwest, several big toll bridge and toll highway projects are in the planning stage on the Pacific Coast. The southern crossing of San Francisco Bay is being studied under a legislative mandate: Final report is due by the end of 1955, and if it is favorable—a distinct probability since tolls from the existing Bay Bridge will help finance the new work—construction could start during 1956.

The State of Washington is actively studying the Tacoma-Everett toll road, and the project may be ready for active design this year. Work should also start this year on another floating bridge crossing of Lake Washington near Seattle. Also a very tentative study is being made of a possible crossing of Puget Sound to West of Seattle.

• **Private toll projects out**—The past year saw a decline in the possibility that some toll roads might be built by private corporations when the Texas Court of Civil Appeals ruled that property of the Texas Turnpike Co. and the Sam Houston Turnpike Corp. would be subject to state and local taxes. Those two companies were the last of the private ones showing any signs of life. And it is significant that Texas now has a Turnpike Authority that soon will have power to build tax-free toll highways along the routes proposed by these companies.

Similarly in Virginia, the only other state where private toll-road companies were granted charters, two public authorities have been set up to finance and build along the routes selected by the private companies.

• **Increased traffic capacity**—Meanwhile, because the volume of traffic on the New Jersey Turnpike has risen to far above that predicted for the current period, the Turnpike Authority will start this year to widen 61 miles from four to six lanes. That widening will give six lanes on the turnpike from Camden, opposite Philadelphia, to the northern end near the George Washington Bridge at New York.

In Connecticut, where work is starting on a new toll expressway parallel to U. S. 1 through the densely populated coast area, plans for that highway call for six lanes from the New York State line to New Haven, with eight lanes through Bridgeport and Norwalk where local movements are expected to rise sharply. This highway is to be financed in large part by tolls collected at barrier-type gates, which permit free local movements at many points.

• **Highway research**—Movements of loaded vehicles over the test road built in southeastern Idaho under the auspices of the Western Association of State Highway Officials and the Highway Research Board were terminated in May. Subsequently numerous static

(*Continued on page* 120)

Preventive Maintenance Cuts Service Cost — Increases Earning Capacity

Long Reach Drawbar

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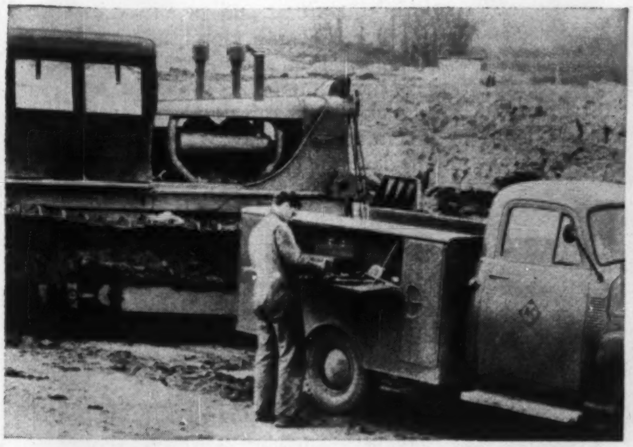
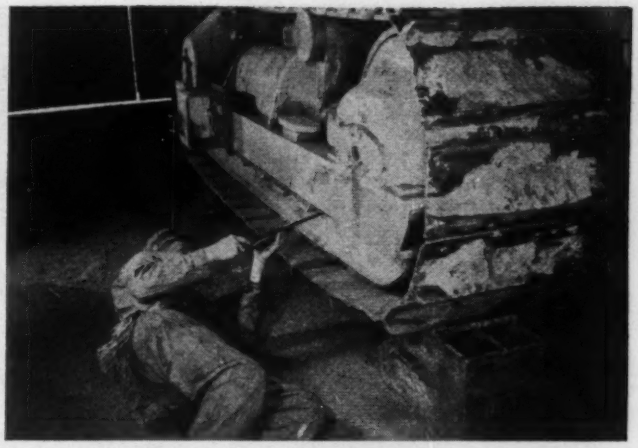


FAST PARTS SERVICE — Factory-built Allis-Chalmers parts are stocked in quantities by the *dealer,* to give you parts service as close to your job as posible. And remember, experienced equipment men agree it pays to use only standard factory-built parts.



SCHEDULED CHECKUP PROGRAM — Your Allis-Chalmers dealer will help you plan a schedule for all maintenance to keep your equipment operating efficiently. You'll save on repair bills, avoid costly downtime, get far better performance, longer life from your machines.

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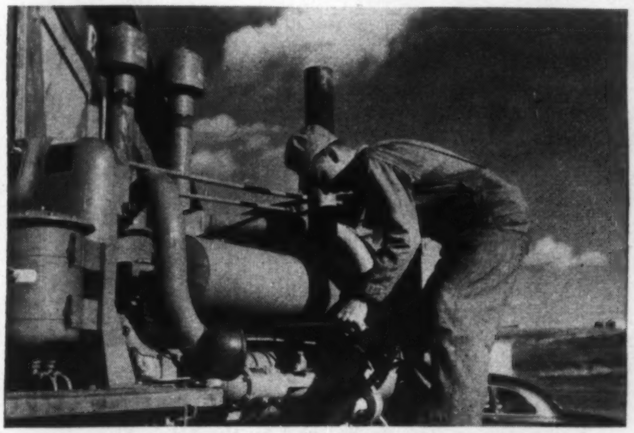
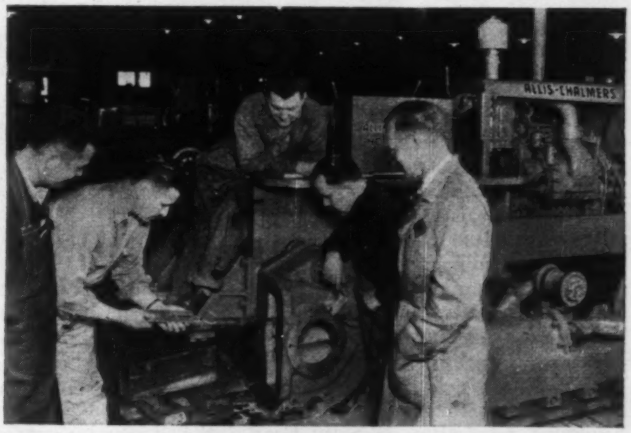


FACTORY-TRAINED DEALER SERVICEMEN have the specialized experience to help you spot trouble symptoms fast, help you prevent costly breakdowns. Their training never stops; they make it a *policy* to stay abreast of every development so they can be of real value to you. And they're ready to go when and where they're needed.



FACTORY SERVICE SCHOOL TRAINING is open to your servicemen just as it is for dealers. Training is by men who know the equipment best. Visual aids and easily understood literature are used. And your men discover that Allis-Chalmers design simplicity makes the equipment easy to learn . . . easiest of all to service.

HARBOR FREEWAY was extended during 1954 permitting first full use of the 2½-mile section that bypasses downtown Los Angeles. Ultimate cost 23 miles: $100 million.

load tests were to be made on the several types of flexible pavements under study, and the pavements were to be examined in detail as a preliminary to final analysis of the results. None of the findings has yet been released, and all are being carefully guarded to avoid a repetition of the unfavorable publicity that developed at the time similar tests were made on an old concrete pavement in Maryland a few years ago.

Plans for much more comprehensive testing of both rigid and flexible pavements under the auspices of the American Association of State Highway Officials moved forward slowly during the year. The main obstacle to an early start is the cost, estimated at $12 million.

Late in the year the Bureau of Public Roads announced that it had signed an agreement with some large chemical companies for cooperative research to find a cheap and broadly useful material or materials for stabilizing soils used in highway construction. Initial studies are to be made at the bureau's laboratories at Gravelly Point, Va.

Demonstrations of a dynamic testing apparatus for asphalt pavements also aroused interest among U. S. highway engineers during the year. Developed in the Netherlands and brought to this country by the Shell Oil Co., the device operates in a stationary position but stimulates the effect of heavy moving traffic through eccentrically rotating masses of metal which impart vibrations through a base plate to the pavement. An oscillograph picks up vibrations, and by measurements of wave-length, amplitude and wave propogation speed, the deflection and dynamic shear modulus of the various layers of pavement may be determined. The device has been tested on the WASHO Idaho test road, by the Army Engineers and a few state highway departments. It has the advantages of mobility, requiring no samples and being non-destructive. Data from its tests are being correlated now and may evolve important specifications for flexible pavements in the future.

• **Pavement resurfacing**—Resurfacing of old pavements with either concrete or bituminous materials continues to be the subject of study in many states to determine the most economical methods. In Missouri, as a result of concrete resurfacing studies begun back in 1932, using thicknesses of 4 in. and 6 in., several miles were resurfaced last year using a 5-in. thickness of new concrete over the old. Mesh reinforcing was placed in the new concrete. Joints in the new concrete were sawed—transverse joints at 20-ft intervals the same day that the concrete was placed, and longitudinal joints the following day.

The past year also saw much wider use of saws for forming contraction joints in new concrete pavements for both highways and airfields along with improvements in equipment and techniques for doing that work. Timing is the critical element. Early sawing reduces the life of the blade and may produce ravelling at the joint opening. Too long a delay may result in development of irregular uncontrolled cracks.

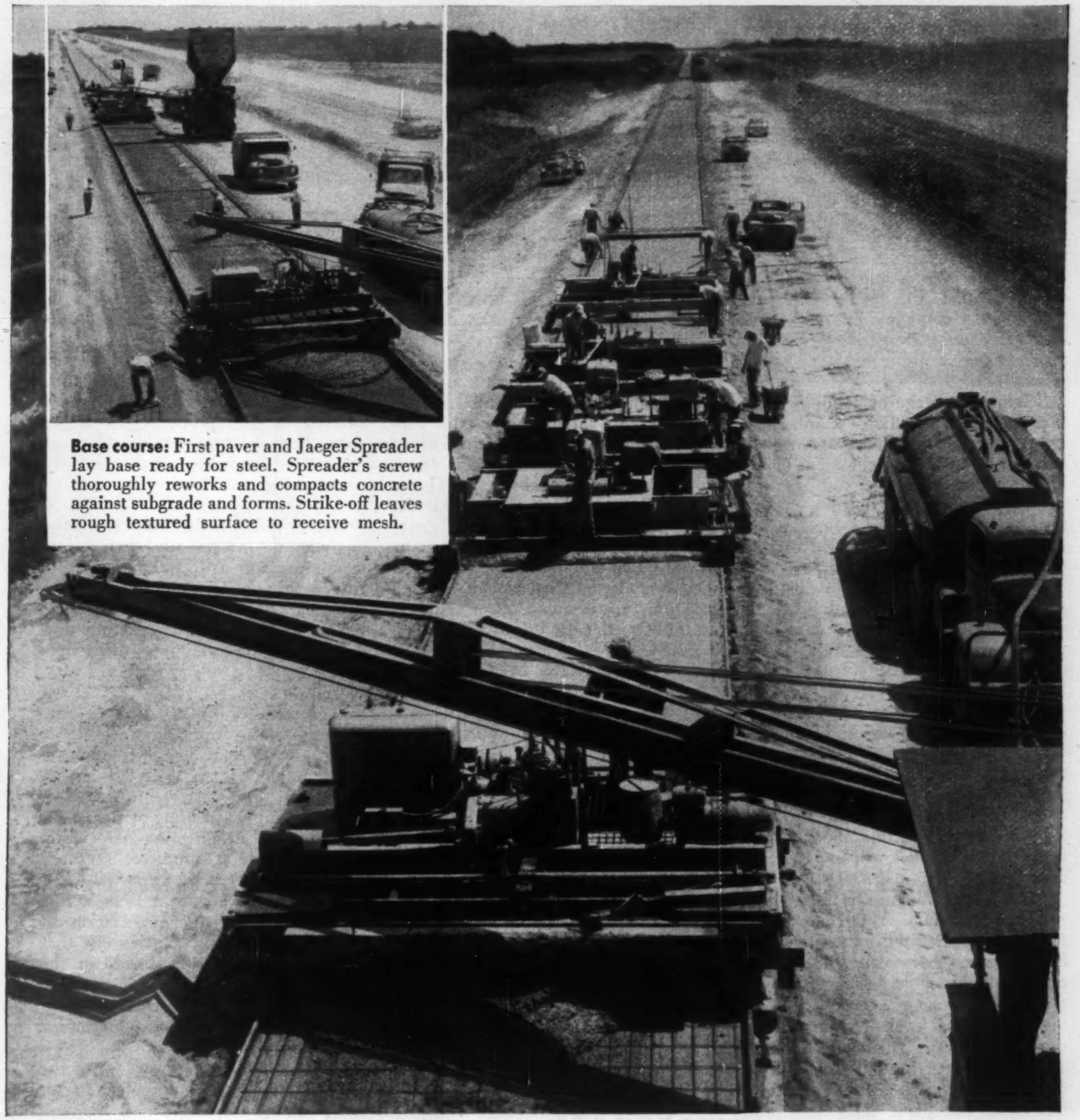
• **Marking pavement edges**—An interesting experiment in pavement marking that received favorable attention during the past year was painting a reflective white line along the outer edge of undivided pavements to assist night drivers—an idea that has received continuous promotion by J. V. N. Dorr, president of The Dorr Co. Such a bright line helps the driver by clearly marking the pavement edge, thus giving him added safe leeway in passing. It also has an optical advantage in giving the driver's eye something to focus on other than the headlights of approaching vehicles.

• **Airport construction**—Construction and modernization of commercial airports continue to lag behind needs. Congress, in August, appropriated $22 million to be used by the Civil Aeronautics Administration as federal aid for local projects. This money was expected to release $130 million in local money for work on 164 projects.

(*Continued on page* 122)

Jaeger Spreaders, Finishers help set the Ohio Turnpike record

7280 ft. of 12 ft. slab in 13-hour day



Base course: First paver and Jaeger Spreader lay base ready for steel. Spreader's screw thoroughly reworks and compacts concrete against subgrade and forms. Strike-off leaves rough textured surface to receive mesh.

This Ohio Turnpike record, by V. N. Holderman & Sons, required perfect organization, scheduling and teamwork. Good equipment helped, too. On top course, for example, the oscillating screed of the Jaeger Spreader accurately metered the concrete between paver and finishing machines. In addition, both Jaeger Finishers were equipped with rear screeds diagonally adjustable for any pitch or super-elevation of the slab. For more data, see your Jaeger dealer or ask for catalog.

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. . . New transport trends

The federal aid can only be used for non-revenue-producing facilities like runways and navigation aids. Terminal buildings must be financed with local money. Most of the federal money is to go for work on the larger airports.

Terminals designed for increased facility in handling passengers and baggage were noteworthy last year. San Francisco, St. Louis, Cleveland and Chicago were among the most important new installations.

The new terminal building at the San Francisco International Airport represents a $14.1-million investment and was opened in September. Designed to accommodate 5,000,000 passengers a year, the facilities include a seven-story main building with two-story concourses radiating from the center to serve airplane loading positions.

Taking advantage of a sloping site, the new $4.5-million Lambert-St. Louis Municipal Airport terminal is laid out for a three-level system of operation. Passengers are routed from the top level to the bottom enplaning level—and vice-versa for deplaning—while baggage is handled on the mid-level.

Cleveland's Hopkins Municipal Airport terminal—the initial stage to be completed next year at a cost of $6.5 million—is expected to handle 1,800,000 passengers annually by 1960. Entrance and egress for both passengers and baggage is on the first floor, but passenger handling will be conducted on the second floor while baggage handling remains on the first floor. To minimize traffic snarls, private cars and busses will be loaded and unloaded at the second floor while taxis and limousines will use the first floor.

Costing $2 million in its initial stage the new terminal at O'Hare Field, Chicago, features the use of telescoping walkways between building and planes which enable passengers to enter and leave planes without descending to ground level. When not in use the walkways will be folded back along the side of the building. When needed they will be swung around on line with the plane door and positioned with hydraulic controls. The terminal is expected to serve 3,000,000 passengers this year.

• **Military airbase plans**—Early in 1954 the Defense Department sent to Congress a request for $1.2 billion for airbase construction exclusive of overseas bases. Congress cut that in half, to $630 million. Even so, the appropriation Congress made was nearly three times what had been appropriated for the fiscal year 1954.

Because of the speed and great weight of the planes to be accommodated on military fields, runway paving continues to be a major item in the construction cost. At Edwards Airbase in California a world's record runway was completed during 1954. Some 15,000 ft long, it is designed for a plane weight of 500,000 lb, and the concrete on parts of the runway and on taxiways and warm-up aprons is 19 in. thick.

At the Lincoln Airbase in Nebraska, where a new 10,600 ft runway was built last year, the 1,000-ft long end sections also are of concrete 19 in. thick. The remainder is a flexible pavement ranging in thickness from 33 to 52 in., including compacted base and bituminous surfacing.

The comparative merits of bituminous and portland-cement concrete surfacing for airbases were the subject of debate at Congressional hearings early last year. The result was a recommendation by the House Armed Forces Subcommittee that the Air Force abandon an existing directive giving concrete paving the benefit of a price differential, and a further recommendation that asphalt be used for non-critical areas of airfields to be built by the Air Force.

The Air Force dropped the price differential and later in the year, on two jobs put out to bid, got lower bids for concrete, without any differential, than for bituminous paving.

• **First heliport**—The country's first heliport, possibly the first in the world, was completed at Fort Eustis, Va., in October. Two asphalt runways, only 600 ft long, crossing at right angles, form the spokes of a wheel for which a circular taxiway forms the rim. It is for use of the Army's Transport Training Command.

At New York City plans are being made for a heliport atop a freight-forwarding terminal on the Hudson River waterfront between 28th and 32nd Streets. From that point, helicopters could reach the city's outlying airfields in about five minutes' flying time.

• **Belt conveyors for commuters**—After years of fruitless discussion of the advantage of moving sidewalks for transporting large numbers of people that began at the Chicago World's Fair in 1893, the first of such facilities to be built for regular rapid-transit use went into service in 1954. It links the Hudson & Manhattan R.R. tube station in Jersey City with the Erie R.R. station, ending a tedious climb of about 300 ft up a 10% slope that has long been a source of fatigue to commuters.

And a much more ambitious project —a belt conveyor system 2,650 ft long to replace the famous shuttle trains under 42nd Street in New York between Times Square and Grand Central Station—is rapidly approaching the contract stage. Unless something unforeseen happens, the Board of Estimate of New York City is expected to authorize the necessary money for the work early this year.

Another novelty in passenger transportation proposed during the past year was a monorail rapid transit system for the Los Angeles region. A 46-mile overhead system was proposed, costing $165 million. Engineers who studied the project for the Los Angeles Metropolitan Transit Authority found the project to be economically feasible with a few ifs, such as freedom to set fares without regulation by the state public utility commission. Interest in the proposal has lagged since the legislature took no action on legislation needed to implement the undertaking.

• **Longer rails**—In the field of railroad engineering, interest in a proposal to standardize on a 78-ft long rail continues active. The chief obstacle is the cost, which the rolling-mill people say will be prohibitive. Study now is centered on obtaining the longer rails by welding two 39-ft rails.

• **High-strength bolts**—Use of high-strength bolts instead of rivets is steadily gaining in favor with railroad bridge engineers who have to maintain about 94,000 steel bridges.

At the annual meeting of the American Railway Engineering Association in March, the Committee on Iron and Steel Structures is expected to report on studies begun in 1948 by the research staff of the Association of American Railroads, which show that on structures where railroads in the past have had difficulty in keeping rivets tight, the high-strength bolts, generally, have been more satisfactory.

• **Fairer bridge clearances**—One of the long-standing sources of concern for both railway engineers and highway engineers—unreasonable requirements for bridge clearances over navigable streams—soon should be a thing of the past. A new set of rules, drafted by a committee set up by the Department of Commerce, was submitted last year to all agencies interested in bridge clearances for study and comment. The rules soon are to be issued in revised form for final approval.

(*Continued on page* 124)

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TRIBORO BRIDGE CROSS BRONX
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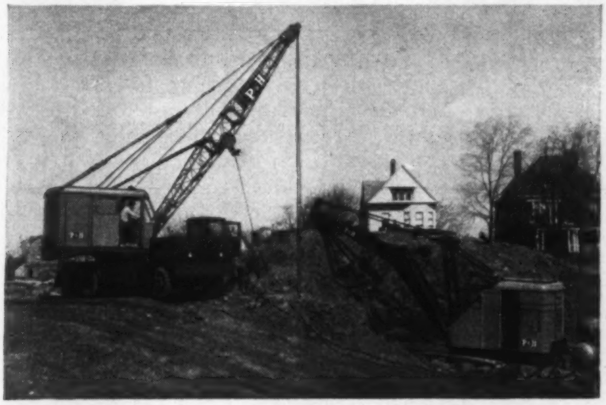
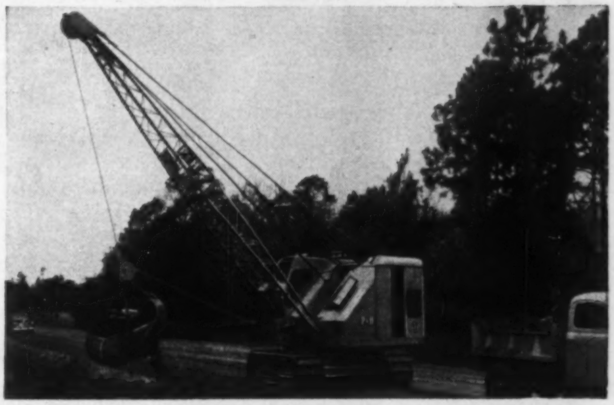
P&H Truck Cranes — two of many that gave a cost-cutting assist on the New York Thruway.

Better ideas are cutting costs



P&H 255-ATC, and a 655-B hoe team up in New Jersey.



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. . . New transport trends

Ultimately it is expected that the new rules will be made the basis for a revision of the General Bridge Act under which the Army Engineers heretofore have set the requirements to be met by railroads and highway departments when bridging streams used as waterways or that could be used for navigation purposes. As now written, that act has the effect of requiring the Corps of Engineers to make provisions for navigational needs that may never develop. The cost to railways and highways has been enormous.

• Brooklyn Bridge reconstruction—No comment on bridge developments during the past year would be complete without recording the fact that reconstruction of the Brooklyn Bridge to strengthen it and provide six lanes for highway traffic was completed in May after three years of work. In the reconstruction, the intermediate trusses were removed and the depth of the outer trusses was doubled, using much of the old steel from the intermediate trusses and following the latticed and eye-bar type of construction of the original structure.

Adding a new bottom lateral stiffening system to the Golden Gate Bridge was completed late in the year as a part of a program to eliminate undesirable sway and vibration. Incidentally, high-strength bolts were used on that work instead of rivets, 190 tons being required.

• Long welded girders—A new record for welded bridge girders in this country was set in building two bridges in the San Jacinto River valley in Texas. Each bridge has a 3-span group of continuous girders having a central span of 200 ft. This length still is far short of welded girders in Europe and of course is shorter than riveted girders in this country such as those of 375-ft spans in the Hackensack and Passaic River bridges of the New Jersey Turnpike.

• Long cantilever bridge—Work is to start soon on a new highway bridge over the Mississippi River at New Orleans. The new bridge will have the longest cantilever span in this country, 1,575 ft. That length is 175 ft longer than the previous record holder in the U. S.—a span in the Bay Bridge at San Francisco—but 225 ft short of the record held by the Quebec Bridge over the St. Lawrence River in Canada.

• Longest bridge—Also in the New Orleans region, work has started on a structure that will be the world's longest bridge—24 miles—to carry a new expressway across Lake Pontchartrain. A bond issue of $46 million was sold late in December to finance the work. Bids on the work were taken in November. The bridge is to be built largely of prestressed concrete, prestressed spans 56 ft long being carried on two 54-in. hollow piles of prestressed concerte.

• Straits of Mackinac Bridge—The most important bridge project in the U. S. is undoubtedly the huge four-lane toll bridge being built between Michigan's upper and lower peninsula. Total length of the project is 3.4 miles with the central suspension bridge measuring 8,614 ft between anchorages, the longest distance between anchorages for any such bridge in the world. Its central span measures 3,800 ft between towers. By the end of 1957 motorists should be driving over the new bridge, cutting the previous travel time by ferry from 53 minutes across the straits to 10 minutes. Not only is this the only time saving, however, since waiting time for the ferry averaged 2½ hours in the summer in past years. At present substructure work on the bridge is 50% complete.

• New bridge erection technique—A new method for erecting long truss spans where deep water makes the construction of falsework impractical has been developed for erecting part of the steelwork on the Richmond-San Rafael Bridge across the north arm of San Francisco Bay. Preassembly of the 289-ft spans on barges, to be later floated to the bridge and raised to position, was ruled out for most of the 36 spans due to tidal currents, the great weight of the trusses—over 400 tons—and the height to which they had to be raised—170 ft above mean water level. Instead, trusses 280 ft long made of high-strength aluminum alloy, which weigh only 117 tons, are being used to provide a working platform on which to erect the permanent steel trusses. The aluminum trusses are supported on timber bents resting on the concrete piers. Because of their much lighter weight, these trusses can be set in place with lifting equipment used for other parts of the erection work.

Piers for the structure represent another bridge building innovation: most are made up of huge precast concrete shells fitted together under water and filled with tremie concrete.

• Pipeline boom continues—Despite a prediction recorded in these pages a year ago that the boom in pipeline construction was over, pipeline construction continued at a high rate all year. A study made last summer by the Oil & Gas Journal indicated that contracts for natural gas pipelines amounting to around $500 million were in sight. Biggest project of the year is a 2,240-mile line across Canada from the Alberta fields to the industrial regions of Ontario and Quebec.

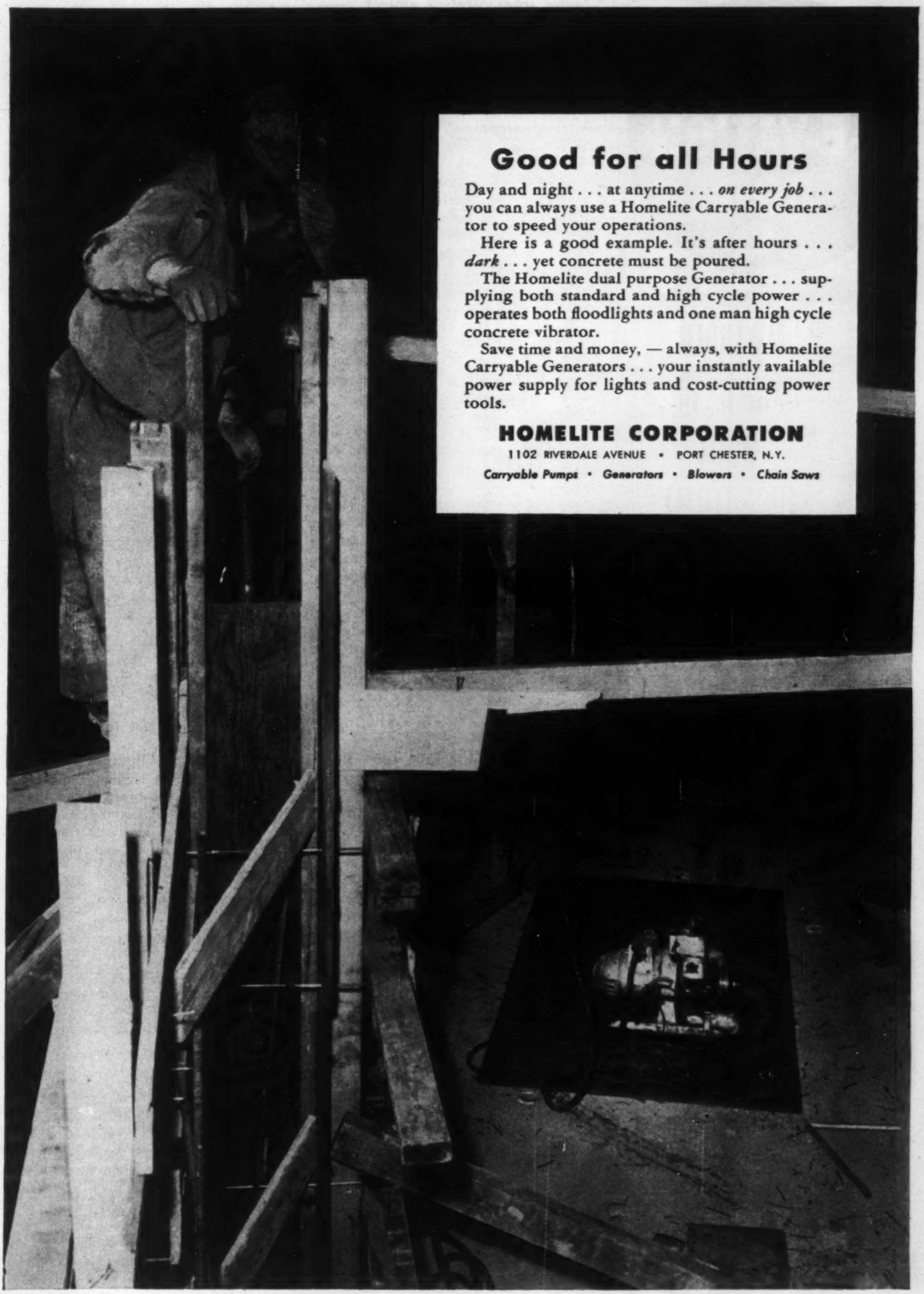
Major Transportation Projects

• Maine Turnpike extensions—Construction of a 62-mile extension of the Maine Turnpike from Portland to Augusta, and a 4-mile spur to Falmouth was begun late in 1953. All major construction work was under contract by August, 1954, and it is expected that the extension can be put into service in October of this year. The cost of the new work is estimated at $55,200,000.

• Massachusetts Turnpike—First contracts for construction of a 123-mile toll highway across Massachusetts from Weston in the Boston area to the New York State line near West Stockbridge were let late in 1954. Since then other contracts have been let progressively in the hope of having construction in full swing by March. The completion date is set for November, 1956. A $239 million bond issue to finance the work was sold in May, 1954.

• New Hampshire Turnpike—Ultimately to extend from the Massachusetts line to Concord, the Central New Hampshire Turnpike is expected to be opened from Nashua to the Queen City Bridge in Manchester by late summer. Primarily for the tourist trade, the 40-mile toll road is so planned that it may be used freely around cities, and in many rural sections by those familiar with the location of the toll stations. The $22.5 million road is scheduled for completion in 1957. Contracts have not yet been let on the northern leg from Manchester to Concord.

• Boston Central Artery—This limited-access route, mostly elevated, eventually will cross the congestion of the city's oldest commercial district, with connections to arterial routes on both sides of the Charles River, and to Mystic River Bridge (northward to Chelsea). Since work began in 1951, $33 million worth of construction has been completed and opened to traffic. This includes the



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Charles River crossing, the Mystic River Bridge connection and a ramp to Haymarket Square in Boston proper. South of this point, location was settled during 1954 and construction was under way. Final project cost will be more than $125 million.

• **Connecticut Expressway** — Engineering consultants for the 129-mile Greenwich-Killingly toll expressway across Connecticut were engaged in July, and the first construction contracts were let late in December. More contracts are to be let soon so that a large part of the work can be started this year. The completion date is set for late 1957, but part of the highway will be in service before that date. The cost, including financing, is $398 million. $100 million in bonds were sold in May, 1954.

• **New York State Thruway**—396 miles of the 427-mile main stem of the New York State Thruway were in service at the end of 1954. Construction is under way on the remaining 31 miles, including the 2.8-mile long Hudson River Bridge, with completion set for late in 1954. The cost, including a connection to one of the toll highways in New Jersey (on which no work has started) is estimated at $587 million.

Construction work has also started on three of the authorized additions to the New York Thruway system. At the end of 1954, 10 of the 15 miles of the New England section were under contract at a cost of $34.4 million. This section extends from the easterly line of New York City to the Connecticut line. Completion is scheduled for Jan. 1, 1957. On the 70-mile Erie section (westerly from Buffalo to the Pennsylvania line) 13 miles costing $8.8 million are under contract. Completion date for this section also is Jan. 1, 1957. On the Niagara section, which runs through downtown Buffalo and on to Niagara Falls, one mile is completed and six more are under contract at a cost of $11.9 million. This work is scheduled for completion Jan. 1, 1957, but a 5-mile section east of downtown Buffalo will not be open until 1959.

• **New York City Expressways**—Mid-1955 opening is expected for **Major Deegan Expressway**, the extension in New York City of the New York State Thruway. Covering 7½ miles, from the north city line southward to Triborough Bridge, it will cost $54.5 million for construction and $9.1 million for land and tenant relocation. All but $500,000 worth of contracts had been let by year-end. **Cross-Bronx Expressway**, which intersects Major Deegan and eventually will take traffic eastward from George Washington Bridge, on the other hand has $49 million worth of construction yet to be awarded. Overall cost of the 5-mile route is $82.5 million, plus $29.7 million for land and tenant relocation. Of the latter figure, $14 million remains to be spent. The project is 30% complete. Just getting under way in the same vicinity is a 3-mile city section of **New England Thruway.** $13 million of the estimated $21 million construction cost was committed in 1955, with $5.2 million still not under contract; completion is 10%. In Queens borough, 3.1-mile Queens-Midtown Expressway was 38% complete at the end of 1954, $8.9 million of the $16.4 million cost having been put under contract during the year; $2.3 million remains to be let. Horace Harding Expressway, 8.6 miles, was barely under way, with the commitment of $5 million for construction and land; $32.9 million remains to be let. A $33 million section of Brooklyn Queens Expressway was 36% complete, $3.4 million worth of work having been let during the year; $17.4 million remains to be let. Most of the foregoing projects are financed under city-state-federal arterial programs. The others (Queens-Midtown Expressway and part of Horace Harding Expressway) are in the Triborough Bridge and Tunnel Authority arterial program. In addition, the city has several projects, the biggest being two additional sections of Brooklyn-Queens Expressway. One, to cost $30.7 million, was 76% complete, with $7.4 million not yet committed. The other, $16.9 million, was 37% complete, with $4 million not yet under contract. $20.4 million Harlem River Drive (2.5 miles) was 25% complete, about half of the total cost remaining to be let.

• **Kingston-Rhinecliff Bridge**—Construction of a new high-level highway bridge over the Hudson River between Kingston and Rhinecliff, New York, began in July, 1954. It is to be 7,793 ft long with continuous trusses over the river and plate-girder spans on approaches. The cost is estimated at $19,300,000. At the end of 1954, all footings for piers and abutments on the approaches were in place, and work on pier shafts was under way on the west side. In the river, foundation piles and concrete bases had been placed for the four westerly piers and granite facing was being set. Steel erection will start this spring, with completion set for November, 1956.

• **Pier "C", Hoboken, N. J.**—Constructed for lease to the American Export (steamship) Lines by the Port of New York Authority, Pier "C" is 95% complete. Designed for a 600 psf loading, the pier features cathodic protection for its 1,400 of 14-in. H-beam steel piles, prestressed main transverse girders and precast, prestressed stringers for the high-level loading platform. The $6.3-million pier is the first step in a $15-million port terminal.

• **Lincoln Tunnel Third Tube**—As the year ended, shield-driving for the mile-long underwater portion of this $100-million Hudson River crossing at New York had progressed to the point where compressed-air work was to be started. A rock tunnel, westward through the New Jersey Palisades to the toll plaza for the present two tubes, had been holed through, and New York City plaza and rock tunneling work were under way. About half of all contracts had been awarded. First traffic will pass through the new 2-lane tube in 1957.

• **Harlem River Bridge**—At year-end rail traffic was moving over the first of two lift spans of New York Central Railroad's $18-million bridge at New York. This permits partial dismantling of an obsolete swing bridge now carrying the railroad alongside the new spans so that the second lift span can be installed and ready for operation in 1956.

• **Hampton Roads bridge and tunnel**—Dredging is under way to establish two bridge-tunnel transition islands athwart the ship-channel entrance to the Virginia port. This is part of the major contract for the $63 million link between Norfolk and the Virginia Peninsula. Tunnel, which is to be of the sunken-tube type, will be 6,750 ft long, with flanking bridges totaling 9,450 ft. Completion is scheduled for 1957. Financing amounts to $100 million, a package that includes refinancing of other area projects and the construction of a Rapahannock River Bridge at Gray's Point. The last-named, estimated at $17 million, was fully under contract in November.

• **Garden State Parkway, New Jersey**—All but 14 miles of the 164-mile Garden State Parkway in New Jersey were in service at the end of 1954. The remainder will be completed by July, 1955. Construction of a new bridge across Great Egg Harbor to replace the present one will be completed in July, 1956. Total cost will be $355 million, which figure includes the $48 million cost of the 19 miles built by the State Highway Department before the New Jersey Highway Authority was organized to complete the parkway as a toll road.

Plans for a connection with the New York Thruway, from the Parkway's northern end, are beginning to jell, and traffic counts have already pointed to the feasibility, in some areas, of adding fifth and sixth lanes to the new facility.

• **New Jersey Turnpike extensions**—All of the major contracts for the 8-mile Hudson county extension of the New Jersey Turnpike had been let by the end of January, 1955. A major part of this project is a high-level bridge two miles long

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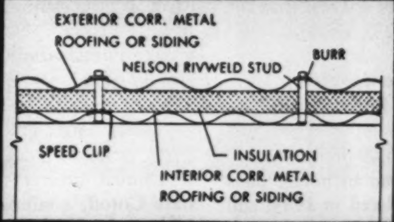
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across Newark Bay. Completion date is set for the spring of 1956. The cost is estimated at $114 million.

Also under construction is a link with the Pennsylvania Turnpike, including a bridge over the Delaware River below Trenton at an estimated cost of $27 million.

Widening 61 miles from four to six lanes is expected to start this year with completion set for early in 1956. That will give the turnpike six lanes from Camden to the northern end. Most of the northern section is six lanes wide now.

• **Pennsylvania Turnpike extensions**—The entire 33-mile Delaware River extension of the Pennsylvania Turnpike was put into service in November. It cost $65 million and completes the main trunk of the turnpike across the state to the Delaware River. Jointly with the New Jersey Turnpike Authority, the Pennsylvania Turnpike Commission is building the six-lane highway bridge over the Delaware as part of the link between the two turnpikes. It is to be completed about the middle of 1956. Also scheduled for the same completion date is the 110-mile Northeastern extension from Plymouth Meeting (northwest of Philadelphia) to the Scranton-Wilkes-Barre area. At the end of 1954, 70 miles of this extension were under contract or out for bids. Total cost of these two projects is $233 million.

• **Delaware River Bridge**—Located 3.3 mi. downstream from the Philadelphia-Camden Bridge, this suspension structure will have a main span of 2,000 ft, carrying 7 lanes of traffic. Tower and anchorage piers were substantially completed in 1954, and tower steel erection began in December. Year-end completion of the bridge was 30%. About half of the approach contracts, $22 million worth, were let in 1954. Completion is scheduled for early 1957.

• **Penn-Lincoln Parkways**—The three-mile Downtown Interchange and the adjacent Fort Pitt Bridge across the Monongahela River were the centers of all 1954 construction activity on this 20-mile east-west through route and downtown-access project at Pittsburgh. (Parkway East and Parkway West had been opened previously.) This leaves Fort Pitt Tunnel, separating the bridge from Parkway West, as the only major project element unstarted. Cost of the total project when completed in 1959 will be $150 million.

• **Kentucky Turnpike**—First grading contracts for the initial 40 miles of a projected north-south toll highway across Kentucky were let about mid-year. Bridge and paving contracts were let subsequently, and the work is expected to be completed by Jan. 1, 1956. Revenue bonds amounting to $38,500,000 have been sold to finance the work.

• **Kansas Turnpike**—The first contract on a projected 236-mile toll highway across Kansas from Kansas City to Topeka and Wichita, thence south to the Oklahoma line, was let late in December. It was for the substructure for the $2.5 million Kaw River Bridge near Lawrence. A contract for grading the first section of the highway (17 miles) was let early in January and all grading is expected to be under contract by June. Paving contracts will be let in July of this year. The completion date is set for October, 1956. Revenue bonds in an amount of $160 million were sold in October to finance the work.

• **Mississippi River Bridge, New Orleans**—A contract for construction of the foundations for a high-level bridge over the Mississippi River at New Orleans was let within the past few weeks. The new structure will be 2,928 ft long, of cantilever type, with a span of 1,575 ft over the river, having an underclearance of 150 ft above high water. $65 million in revenue bonds were sold in October, 1954, to finance the project. Completion date is expected to be late in 1958. The bridge is being built by the Mississippi River Bridge Authority.

• **Lake Pontchartrain Bridge**—As 1955 began, financing for this $31 million over-water trestle, to be the world's longest, was completed and the contractor was given notice to proceed. Its 24-mi length is 4 miles greater than the Great Salt Lake Cutoff, a railroad trestle. The Lake Pontchartrain crossing will be all-prestressed—both the foundation piles and the spans. The latter will be 56 ft long each, with stringers and deck cast monolithically. Work also includes six miles of approach roads on the north side of the lake and three miles on the south, just west of New Orleans. Contract time is 20 months.

• **Ohio turnpike**—At the end of 1954 Ohio's east-west 241-mi turnpike, linking the Pennsylvania and Indiana turnpikes, was 65% finished. About one-third, or 2,500,000 sq yd of the required 7,000,000 sq yd of concrete pavement had been completed. The eastern 22-mi section was placed in operation Dec. 1, and the Ohio Turnpike Commission plans to open the entire project on Oct. 1 of this year. When the final contract was awarded July 15, 1954, it brought the total cost of roadway and bridges to $217.6 million —2.7% above the estimate made in 1951 by the commission's consulting engineers.

• **Ohio Expressways**—Contracts to be awarded this year by the Ohio Department of Highways for expressway construction in six major cities—plus right-of-way costs—are expected to add up to $63 million. **Cleveland** gets the largest portion, with $29.5 million for construction on its 8-lane interbelt expressway system. **Cincinnati** will get $11 million for construction on Millcreek Expressway and the Third St. viaduct. Two miles of four and six lane expressway in **Akron** will cost $10 million. Second-stage construction on the Sandusky-Spring interchange in **Columbus** together with a ¾-mile section of the interbelt, will cost about $7.5 million. About $3 million will be spent for 1.2 mi of four lane divided expressway in **Toledo**, on State Route 120; and $2 million for a 3-mi four lane expressway in **Dayton.**

• **Cleveland railroad bridges**—An $18 million bridge replacement program on the **Cuyahoga River** is being executed under joint participation agreements between the Corps of Engineers and four railroad companies. A 217-ft vertical lift span for the N.Y.C., now 45% finished, is scheduled for completion late this year, as is a 265-ft vertical lift span for the N.Y.C. and P.R.R. although it is only 17% finished. Two contracts awarded last year, totaling $8.5 million were for a B&O 255-ft trunnion bascule span, now 20% finished; and a 267-ft vertical lift span for the N.Y.C.&St.L, now 16% complete. Both bridges are scheduled for completion late next year.

• **Indiana toll road**—The Indiana Toll Road Commission, in weekly lettings from Sept. 1 to Dec. 15 received low bids totaling $75 million for the construction of the eastern 136 mi of its east-west toll road extending from the Ohio line to just east of Gary. This left 20 miles of toll road remaining to be put under contract at the west end of the 156-mi, $280-million toll road, which will connect with Chicago's proposed Calumet Skyway toll bridge project at the Indiana-Illinois state line. Legal difficulties with Gary have held up the award of some of the contracts, but these should be awarded by late spring. Final completion date is now set for Nov. 1, 1956.

• **Detroit Expressways**—About 3¼ mi of the north-south **John C. Lodge** expressway is open to traffic, and the entire 9-mi project is planned to be completed in 1957. About $8 million of construction will be placed under contract this year. Right-of-way costs to date have totaled $31.3 million. A total of $34.5 million of construction has been completed, including $6 million completed last year. An additional $6 million worth of work is in progress.

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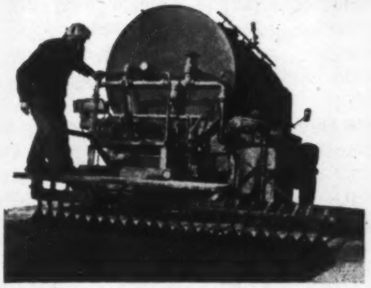

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west **Edsel Ford** expressway has been open for several months from its western end, at the west city limits of Detroit, to Grand River Ave. The next section, including an interchange with the Lodge expressway was opened early this year.

To date, $138 million has been paid out for work completed on the two expressways. Another $12 million is under construction.

- **Mackinac Bridge**—With a 3,800-ft center span, 1,800-ft side spans, 472-ft long backstays plus 135-ft massive anchorages, the Straits of Mackinac Bridge is the longest (total length) such suspension bridge in the world: 8,614 ft. When construction was shut down for the winter on January 14, the $26-million substructure contract was 50% finished, and 48% of the contract time had elapsed. The six main piers, Nos. 17 through 22, to carry the suspension portion of the bridge were essentially complete. Erection of the steel towers on the main piers 19 and 20 will start by June 1, 1955, and the project is scheduled for completion ready for traffic by November 1, 1957. This year's construction schedule calls for completion of the remaining 28 concrete piers.

- **Chicago Bridges**—During 1954 Chicago spent $3,500,000 on continuation of the largest bridge construction program in its history, also $680,000 on modernization and rehabilitation of existing bridges. Under the new work program the superstructure for the $5 million twin bascule bridges to carry the West Congress St. super-highway over the South Branch of the Chicago River is nearing completion, with opening set for July.

Erection of the superstructure of the $3.4 million double-leaf bascule on North Halsted St. was started in December. Construction of the north approach was advertised in January. Opening is set for November, 1955.

The substructure has been completed for the $3.4 million double-leaf bascule on West Van Buren St. and erection of the superstructure is scheduled for May, with opening set for March, 1956.

Substructure work has started on the East Lake St.-North Beaubien Ct. Viaduct, estimated to cost $1 million. Completion date is Dec., 1955.

A substructure contract has been let for a double-leaf bascule on East 95th St. to cost $4.8 million. Construction on this project has been held up pending extension of utility tunnels and construction of new shafts clear of the bridge site. Completion is expected in 1957.

- **Chicago transit**—The city's Department of Public Works will perform at least $10 million worth of work this year on various superhighway routes now under construction. It will also spend $10 million for subway extension work in Congress St. Contracts awarded last year included $5 million of superhighway and $3.5 million of subway construction. The superhighway work was done in connection with the Congress Street and Northwest Expressways, and an extension of Wacker Drive. North Lake Shore Drive was also extended from Foster to Hollywood Avenues. Last year's subway work included an extension in Congress St. of the Dearborn St. subway.

- **Air Force Bases**—Construction involving large expansion of many Air Force bases in this country was continued actively during the past year. At most bases the principal items were the construction of longer and stronger runways capable of handling much heavier planes than those for which the bases were designed originally. Other work involved new operational and fuel-storage facilities, barracks, hospitals, hangars and utilities. The larger operations (over $10 million in current contracts) are under way at the following bases: Abilene Base, Texas $27.5 million); Bunker Hill Base, Peru, Ind. ($10.1 million); Chanute Base, Rantoul, Ill. ($12 million); Dover Base, Del. ($12 million); Edwards Base, Calif. ($16.7 million); Homestead Base, Fla. ($14.5 million); Kirtland Base, Albuquerque, N. M. ($10.1 million); Laurence G. Hanscom Base, Bedford, Mass. ($18.3 million); Little Rock Base, Ark. ($30 million); Loring Base, Limestone, Me. ($15.8 million); Plattsburg Base, N. Y. ($25 million); Portsmouth Base, N. H. ($49.4 million); Westover Base, Chicopee Falls, Mass. ($12.5 million).

- **Texas expressways**—The Texas State Highway Department spent $8 million in 1954 for 9 mi. of urban expressways, of which $4.3 million worth of work was completed. The department completed 7 mi of urban expressways last year making a total of nearly 60 miles in five major cities. Houston has 20.2 mi; Dallas, 14.4 mi; Fort Worth, 10.8 mi; Austin, 8.4 mi; and San Antonio, 5.3 mi. The largest single project in the design stage is a high-level bridge on U. S. Highway 181, spanning Corpus Christi Bay. It will carry six lanes of traffic across the ship canal, at a height of 300 ft above the water.

- **Sandpoint Bridge**—Idaho Highway Department's mile-long $3-million span across the Pend Oreille River got well started in 1954. Special features of the structure include long composite piles—timber bottoms and concrete-filled steel shell tops—and a precast concrete deck.

- **Los Angeles freeways**—Twenty miles of full freeway were completed in the Los Angeles area during 1954, bringing the total length of completed freeways to 66 miles. At the end of the year, there were 34 freeway construction jobs under contract for a total of $43.8 million. Names on some of the freeways were changed during the year including Arroyo Seco to Pasadena Freeway and Ramona to San Bernardino Freeway. Completion of a 2-mile section of the Santa Ana Freeway and the final 1.1-mile section of the Hollywood Freeway gave an uninterrupted 26-mile stretch from the San Fernando Valley, through central Los Angeles to the town of Norwalk. In November, a 13½-mile stretch of the San Bernardino Freeway was opened, the longest single length of full freeway ever opened at one time in California. Completion of a 1.3-mile, $1.8 million contract brought the completed portion of the Harbor Freeway skirting downtown Los Angeles to 3 miles. At the harbor end of this freeway, work began on a 2.8-mile, $3.4 million contract.

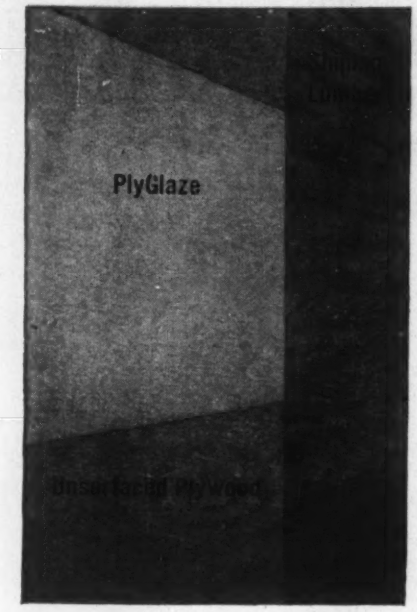
- **Spokane freeway**—Construction will continue in 1955 on a $7 million, 12-mile, freeway extending eastward from Spokane to by-pass populated suburban areas on U. S. 10. Expenditures for the 1955 calendar year are indefinite pending legislative action. During 1954, $650,000 in contracts were awarded for overpass and approach construction, and major portions of right-of-way were purchased.

- **Alaskan Way Viaduct** — Work was brought to completion during 1954 on a $2.5 million contract for the Battery St. vehicular subway, Seattle's first, to connect the north end of the Alaskan Way viaduct with the main highway out of the city. Bids will be asked in 1955 on a $4½ million southward extension of the viaduct.

- **Dunwamish River Bridge**—Graving dock work was completed on the piers for a $7 million bridge across the Dunwamish River at First Ave. S., Seattle, under a $1.4 million contract awarded late in 1953. The structure has unique piers that float during construction.

- **Snohomish River Bridge**—A $2 million lift bridge was completed across the Snohomish River near Everett, Wash. The bridge has a 131-ft lift span flanked by two 180-ft truss spans and has in addition two 240-ft truss spans. Approach spans bring the bridge length to nearly 2,500 ft.

- **Vancouver Wash., freeway and interchange**—A $7 million Washington state highway program will be opened to traffic in mid-March. The nearly three miles of four-lane superhighway is designed to uncork one of the worst traffic bottlenecks



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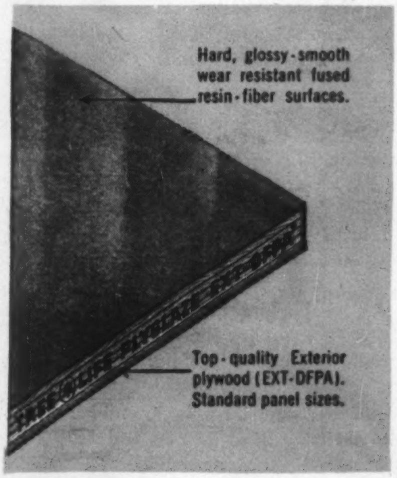

Hard, glossy-smooth wear resistant fused resin-fiber surfaces.
Top-quality Exterior plywood (EXT-DFPA). Standard panel sizes.

Major transportation projects—

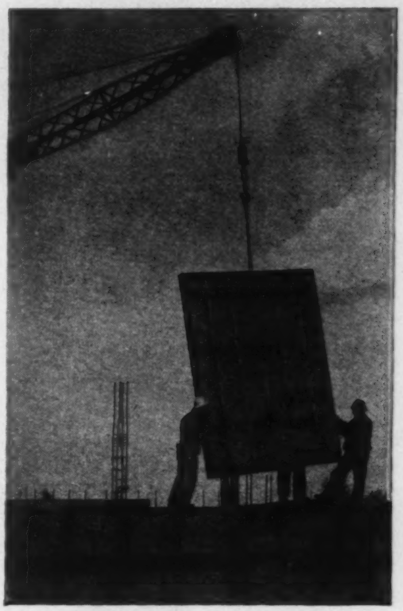
on the west coast. The pattern will unwind traffic flow moving north across the Columbia from metropolitan Portland, Ore. It includes seven overhead crossings.

- **Bayshore Freeway**—A ¾-mi. elevated section in San Francisco of this 49-mile highway, which will ultimately connect San Jose, Calif, with the San Francisco-Oakland Bay Bridge, was completed during the year. Of all-welded steel construction, it cost $3.6 million. Work is continuing on another elevated portion, a 0.7-mi. strip which will connect the freeway with the bridge approach. The $4.9 million job is to be finished by the middle of 1955. Mid-1955 also is completion date for a $2.3 million contract for a 1.7-mi. segment in San Francisco, and grading is under way on a segment just inside the city limits. A 5-mi. section between San Mateo and San Carlos is under construction. The $4.1 million project will be opened to traffic in April, 1955.

- **Eastshore Freeway**—This 56-mile freeway extends along the east side of San Francisco Bay from Richmond in the north to San Jose in the south. Completed to date: 26 miles at a construction cost of $27 million. Total right-of-way expenditures have been $19 million. Construction started in November, on a 4.8-mi. segment at the northern end, involves construction of nine reinforced concrete bridges. The project, expected to cost $5.5 million, received largest budget allocation for single job in Northern California highway history. Completion is scheduled for mid-1956. Construction also is under way on a segment 3 mi. long under a $4.8 million contract to be finished in August, 1955. A 1.5-mi. segment just north of the approach to San Francisco-Oakland Bay Bridge was completed in November at a cost of $2.8 million. Half finished is a $4.8 million revision of the distribution structure at the east end of the Bay Bridge. Additions of new ramps will change the traffic pattern, eliminating cross-weaving.

- **Richmond-San Rafael Bridge**—The $62 million vehicular bridge across the north arm of San Francisco Bay was half finished during the year. The bridge will be 4 mi. long with two 36-ft decks, each carrying three traffic lanes. Bridge will have two steel cantilever structures, plus truss and girder spans. Construction features include use of huge precast concrete shells in foundation work and 280-ft long aluminum truss spans as falsework supporting steel truss construction.

- **Waldo Grade**—Conversion of this 4-mi. portion of U. S. 101 just north of the Golden Gate Bridge from a four-lane undivided highway to a divided six-lane



50 to 75 is a good average, but with care you can get up to...

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PLYGLAZE's tough, hard surface stands up indefinitely under repeated concrete pourings. PlyGlaze forms are worn out only when the panels are cut into unserviceably small pieces. With proper design and care you should get 50 to 75 re-uses. Actually, *over* 200 have been obtained—even then PlyGlaze continues to form good-looking concrete.

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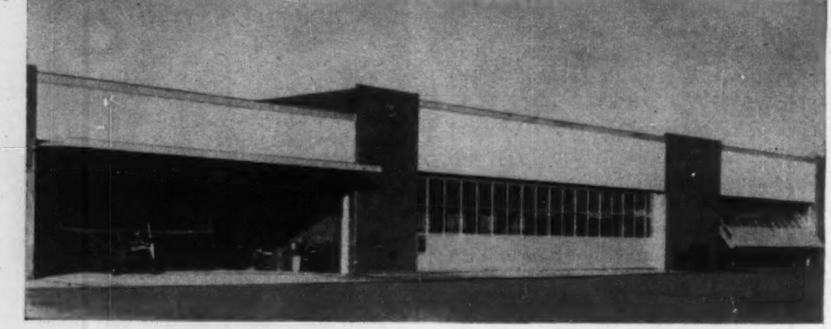


INTERNATIONAL - BUILT TURNOVER CANOPY DOORS: three 60' x 19' and one 90' x 19'. General Contractor: VOLLMER CONSTRUCTION COMPANY, Wichita, Kansas, for CESSNA AIRCRAFT COMPANY, Wichita, Kansas.

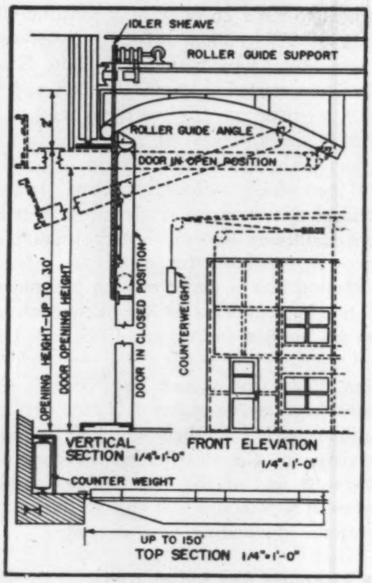
Why

INTERNATIONAL-ENGINEERED DOORS

assure all-weather service, all-around savings . . .

INTERNATIONAL DOORS are each "tailor-made" to best fit the specific entrance need — building use, space requirements and operating speed. But *all* International-engineered doors are designed and built to assure these three important advantages, yet at moderate cost:

(1) Fast and easy operation under climatic conditions of every extreme. (2) Lasting weather-tightness that seals out wet and cold and cuts heat loss. (3) Engineering and fabrication, based on the broadest specialized experience in the field of major doors, that overlook nothing to minimize maintenance of any door developed by International . . . however intricate the individual design and whatever the type or size. See Sweet's Architectural File.



The above detailed drawing of a typical International Turnover Canopy Door illustrates its special suitability for small to medium openings — where floor space and interior clearance are limited. Door rises vertically, then swings out and up, with approximately 50% of door height projecting outside as a canopy. Offers extra protection against bad weather. Always clear of usable floor space in opening or closing.

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INTERNATIONAL STEEL COMPANY

freeway is to be finished in late 1955. The job involves construction of a 1000-ft tunnel adjacent to an existing tunnel plus viaducts and other structures. Tunnel construction and grading costing some $4.5 million is to be finished in February, 1955. Paving and other finish-up work amounting to $1.5 million will be done later under a separate contract.

• **Columbia River Bridges**—A $3 million toll bridge being built by Umatilla County, Ore., west of McNary Dam, the fifth Columbia bridge linking Oregon-Washington, is advancing on schedule for opening in the spring. Oregon Highway Department also has completed soundings just west of Interstate bridge at Portland, Ore.-Vancouver, Wash., for design work on the the $12 million span to parallel the existing bridge.

• **Portland-Salem Expressway**—End sections of this 45-mile long route linking metropolitan Portland and the state capital city were opened to travel in 1954. Traffic began moving from Portland and south to Hubbard via the Wilsonville bridge in August. At the Salem end of this $12 million project, a 10-mile long by-pass costing nearly $3 million slips major north-south traffic around the capital. At year's end, contracts for all work had been let for completion by October, 1955.

• **Old Oregon Trail**—Major relocation of the damed Emigrant Hill section of the pioneer route to the west is underway southeast of Pendleton. Hairpin curves and grades will be reduced sharply by the new 15-mile routing to be completed in October. Other sections east and west of the hill, costing more than $8 million, are under way. Part of this work involves moving the highway from The Dalles Dam reservoir area. The Columbia River gorge section saw completion of the last unit of a 69-mile waterlevel limited-access highway which replaces a 1922 scenic road. Travel time between Portland-The Dalles has been cut a full hour by dropping the route off the ramparts of the gorge.

• **T. H. Banfield Expressway**—This 14-mile freeway is taking shape for completion in 1957 as contractors prepare grades in sweeping curves through Sullivan's Gulch leading east from mid-town Portland. A portion of the six-lane $16.5 million route is to be opened by Fall.

• **Cost Highway U. S. 101**—Oregon is making a bid for the West Coast tourist traffic between California and Canada with this coastline route. Completed the past year was a 21-mile, $5 million Reedsport-North Bend section and by fall, a 13-mile section near Siletz Bay, under way two years at a cost of $2 million, will be open. By summer, the important Port Orford-Gold Beach 24 mi. relocation costing $6 million will be opened.

• **Port of Long Beach**—Contracts totalling about $12 million were started in 1954 at Long Beach Harbor for pier development and new transit sheds. A major project was the $2.5 million, 6-berth Pier C development which is 75% complete. An additional $16 million is planned for projects to start in 1955 including two bridge superstructures costing approximately $6.4 million each and three transit sheds amounting to a $3.75-million investment.

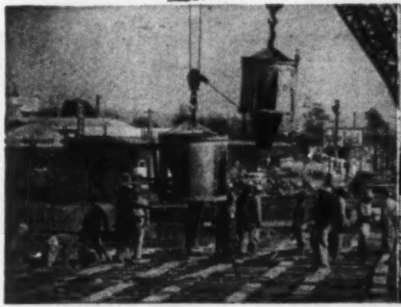
• **Honolulu, T. H.**—Completion is expected about March 1 of the new $5.2 million overseas freight terminal being built by the territorial government. A 1717-ft concrete pier costing $900,000 plus $1.8 million for land is complete. Work is being completed now on a 355,000-sq ft pier transit shed which will cost about $2.5 million.

• **Hilo, T. H.**—About 29 miles of the 40-mile, 24-ft wide Hamakua Coast Highway was complete or under construction at the end of 1954 with 1.8 miles under construction and another 1.8 miles programmed for 1955. Work on the final 9 miles of the $17.5 million program job will proceed slowly because a special federal grant is now nearly exhausted and money for the final stretch must come from regular federal aid, territorial public works and county fuel tax moneys. The project, requiring 40 major and several minor bridges, serves a high, gulch-pocked coastline through a sugar-growing area.

• **Honolulu, T. H., Highway**—About 1½ miles of Honolulu's second post-war arterial highway was complete as 1954 ended, and ½ mile was under construction and nearly complete. The first 2 miles have cost $4 million for construction and another $3 million for rights-of-way. An additional 0.7-mile stretch is to be put under construction in 1955. The finished highway will be about 7 miles long, and cost about $30 million including $14 million for land acquisition.

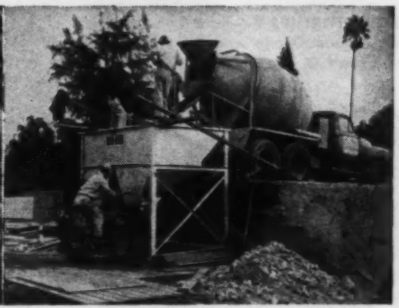
• **Honolulu, T. H., Tunnel**—Two tunnel routes are being constructed across the Koolau Mountains which separate the main city of Honolulu from its growing Windward Oahu suburbs. The City-County of Honolulu started work last January on a 2,773-ft tunnel on a route through previously unopened land in Kalihi Valley. Boring had passed the 2,000-ft mark when a cave-in killed five men August 14 and work has been interrupted since that time by controversies over design and responsibility.

it takes SPECIAL DELIVERY on concrete jobs



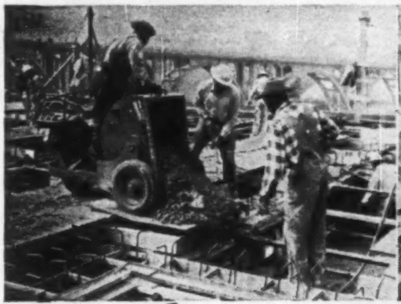
SPECIAL DELIVERY ELIMINATES RAMPS

In building construction, Gar-Bro Concrete Buckets save the cost of building ramps and scaffolds.



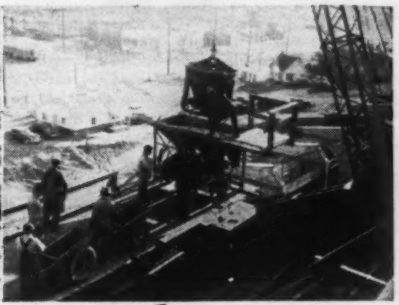
SPECIAL DELIVERY PREVENTS DELAYS

Delay of truck mixers, and placing and finishing crew are eliminated with Gar-Bro Hoppers.



SPECIAL DELIVERY 5 TIMES FASTER

Fast shuttle speeds over longer distances prove economy & high hourly capacity of Gar-Bro Power-Carts.



SPECIAL DELIVERY IS A 1-2-3 OPERATION

This Gar-Bro Hopper is serving as intermediate concrete storage between bucket and carts.

to increase profits

EVERY CONCRETE JOB requires *special delivery* methods for handling and placing concrete *profitably*. It takes planning and it takes careful selection of equipment of the right capacity. That's the big reason why you should depend upon Gar-Bro. For only Gar-Bro has a complete line of concrete handling equipment in all sizes and capacities.

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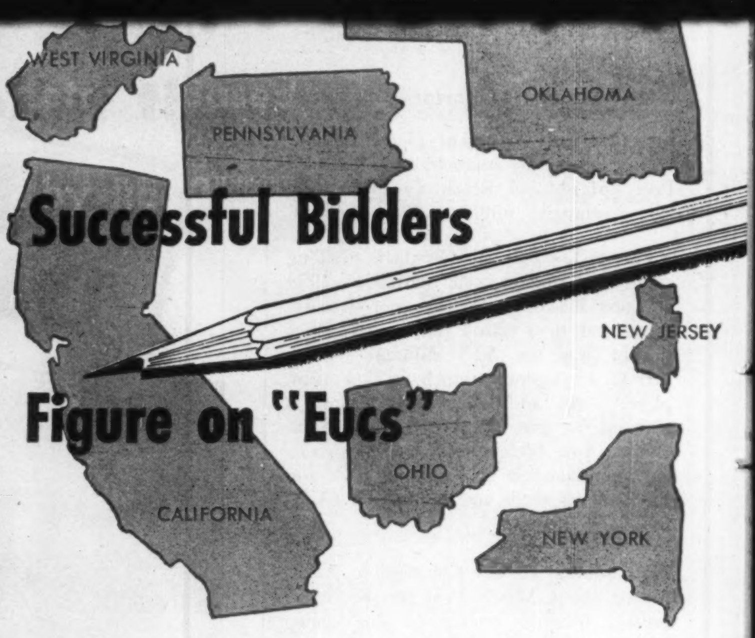
NEW YORK THRUWAY—more than 500 "Eucs" of all types—Rear-Dumps, Scrapers, Bottom-Dumps and Loaders helped rush many sections of this 427 mile road to completion.

WEST VIRGINIA TURNPIKE—probably the most rugged test of equipment on all turnpikes to date because of the rocky, mountainous country. Of 275 off-highway rear-dump trucks used on the job, 260 of them were "Eucs".

CALIFORNIA—Euclid equipment has played an important part in building many of the modern super highways in the West. The "Euc" Scraper shown here is working on the Los Angeles Golden State Freeway.

OHIO—Bottom-Dumps and Euclid Loaders dominated the construction scene on the Ohio Turnpike. "Eucs" outnumbered all competitive rubber tired earth moving equipment by better than 4 to 1.

Successful Bidders Figure on "Eucs"



On almost every section of every turnpike project there's been mighty keen competition for the jobs—usually 10 or more bidders. When your competitors are using "Eucs" to move dirt or rock faster and cheaper, you just can't afford to pass up the cost-cutting advantages of Euclid equipment. That's why successful bidders on hundreds of earth moving projects base their estimates on the production performance of Euclids.

Money-making performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

FOR TOUGH ROCK JOBS...

and other heavy excavation, Rear-Dump "Eucs" are the logical choice as they were on the West Virginia Turnpike by more than 9 to 1. Capacities range from 10 to 50 tons with engines of 125 to 600 h.p., with some models equipped with Torqmatic Drive.

FOR BIG YARDAGE PRODUCTION...

the Loader and Bottom-Dump combination has no equal for high speed loading and hauling of earth and free flowing material. Bottom-Dumps have struck capacities of 13, 17 and 25 cu. yds. with loaded top speeds up to 35 m.p.h.

FOR SCRAPER JOBS...

big or small, there's a complete line with struck capacities of 7, 12, 15.5 and 18 cu. yds. High production and dependable job availability of "Euc" Scrapers has made them the fastest growing line in the industry. The "Twin Power" Scraper shown at the left has exceptional versatility—it's been a one-man earth moving spread on lots of jobs!

There are lots of reasons why the men who know equipment use "Eucs" but they all add up to this simple fact:

EUCS MOVE MORE LOADS PER HOUR AT THE LOWEST COST PER TON OR YARD

It's "Eucs" on the Indiana Turnpike now!

INDIANA
ERS-00

First contract on the Indiana Turnpike covering a 7.4 mile section was awarded to Rieth-Riley Construction Co. Grading is being done by Chapin & Chapin of Norwalk, Ohio—over a million cubic yards are to be moved. In the photograph, one of a fleet of 8 Euclid 15.5 cu. yd. Scrapers is shown working on an overpass northwest of South Bend.

Euclid equipment was used by most of the contractors who built our first super road — the Pennsylvania Turnpike — more than 15 years ago. Since that time "Eucs" have been the choice of contractors for grading work on just about every super-highway project from Maine to California.

The new Indiana Turnpike is no exception—Euclids will be used on nearly all of the grading contracts awarded to date. In fact, "Eucs" already outnumber competitive rubber tired equipment by a wide margin and many more will go to work when the job moves into high gear.

Men who bid these big jobs can't gamble on the selection of equipment — they have to play it safe with machines they can depend on to do the most work at the lowest overall cost. Even if you don't bid on these big projects, the same dependable low cost performance of "Eucs" can mean more profits — and more jobs — for you. Call your nearby Euclid dealer for help with any earth moving problems — he's at your service to help you make more money on every job.

"Eucs" paid off in performance on all of these toll road projects:

NEW YORK THRUWAY
PENNSYLVANIA TURNPIKE
NEW JERSEY TURNPIKE
MAINE TURNPIKE
OKLAHOMA (TURNER) TURNPIKE
WEST VIRGINIA TURNPIKE
OHIO TURNPIKE

and on other highway jobs all over the world.

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Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Low land, flat grades?
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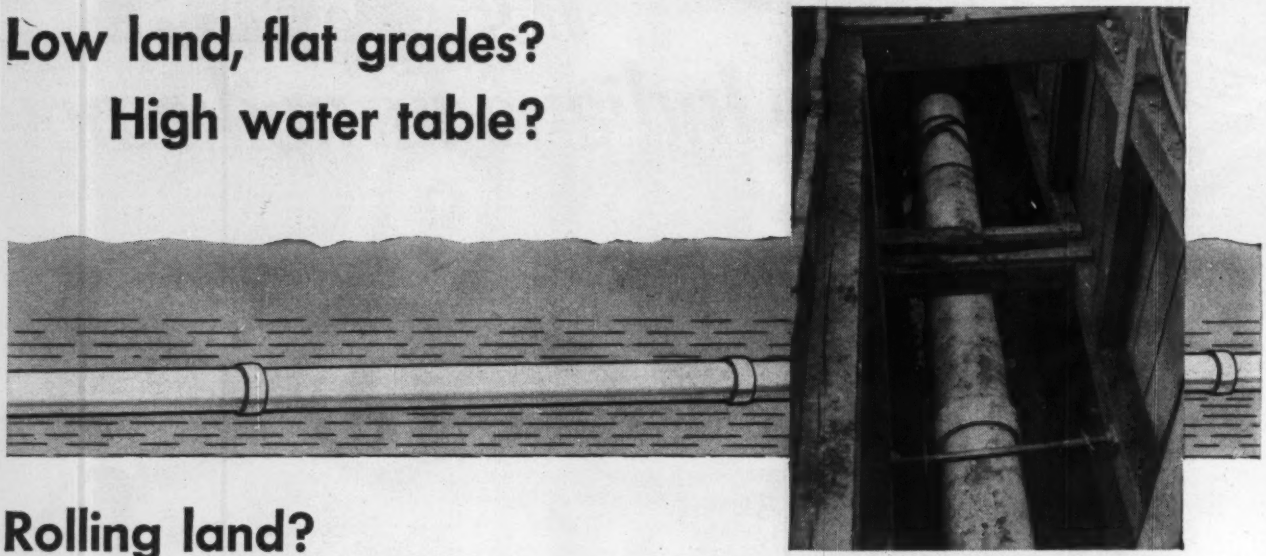
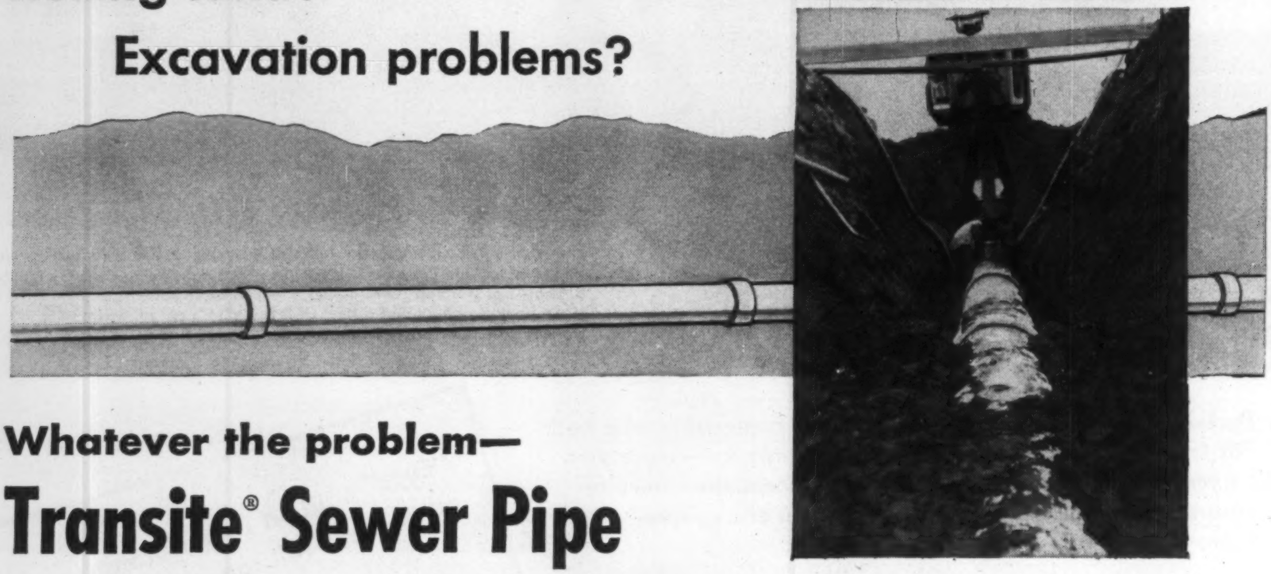


Rolling land?
Excavation problems?



Whatever the problem—
Transite® Sewer Pipe
speeds installation, cuts operating costs

In a wide range of conditions, Transite Sewer Pipe and its Ring-Tite Coupling provide installation and operational *plus-advantages* that add up to important cost savings.

[Flow Coefficient n=0.010] For instance, with Transite Sewer Pipe, specified velocity of flow can be attained at a minimum grade. Initial savings may also be reflected in smaller pipe sizes. Its unusually low flow coefficient (n = 0.010 derived from the Manning formula) makes this possible. This means less cubic yards of excavation, and may also mean . . . elimination of pumping . . . location of treatment plant at higher elevation . . . lower installation costs especially if in wet or ground-water conditions.

[Tight Joints] Where ground water conditions exist (due to a constant water table or during seasonal rains) Transite's Ring-Tite Couplings are *tight* . . . thus treatment-plant dollars are spent to treat *normal* sewage only, not excessive and unnecessary infiltration.

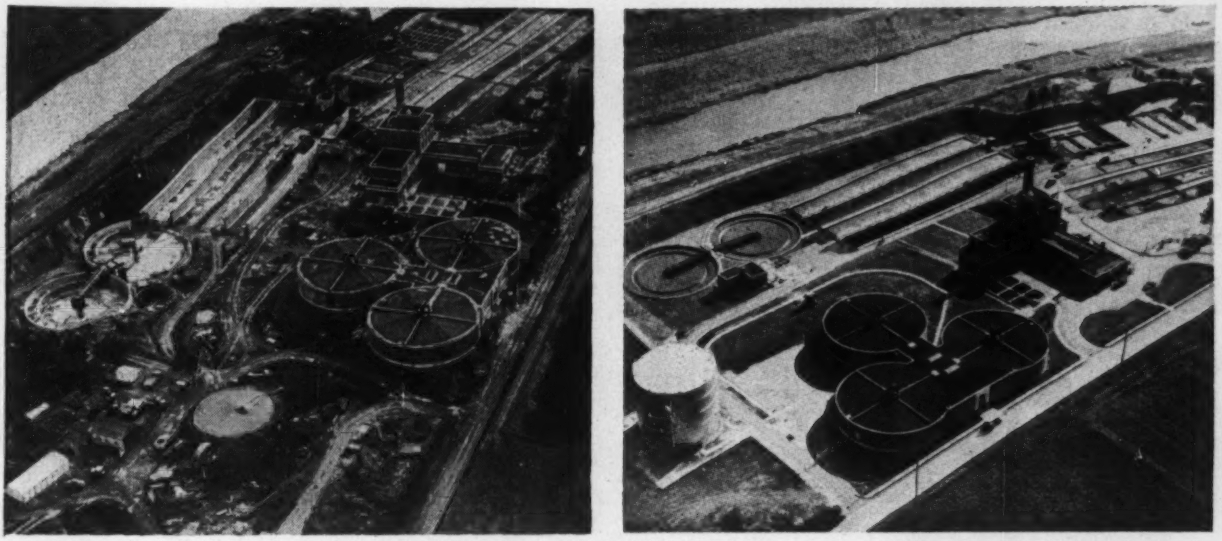
[Strength] Made of asbestos and cement, Transite Sewer Pipe is strong and durable. It withstands heavy load stresses, eliminates expensive cradling in many cases. It is available in two strength classifications.

Transite Sewer Pipe is easily handled, quickly assembled and lowered into trench where it adjusts more accurately to line and grade. The Ring-Tite Couplings are easily and quickly pulled, forming tight, flexible joints that *start* tight and *stay* tight.

For your copy of TR-94A, the helpful widely used Sewer Design Flow Chart, based on the Manning formula, write Johns-Manville, Box 60, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville TRANSITE SEWER PIPE**

THE PIPE WITH THE TIGHT JOINTS



PICTORIAL PROGRESS REPORT proves 1954 a busy year in York, Pa. Plant was snapped at year's end, 1953—and recently.

Techniques and Trends . . .

Water Supply and Sanitation

Dollar volumes of construction in both waterworks and sewerage dipped slightly in 1954 after encouraging records of 1953, but activity in both fields was substantially ahead of volumes of 1952, the previous high period.

Sewerage volume was down about 8%—from $431 million in 1953 to $388 million in 1954—but the $388 million represents a 24% increase over the 1952 expenditure of $304 million. Waterworks, with $245 million spent in 1954, was off only about one percent from the 1953 record of $247 million.

For 1955, prospects are good for a return to record breaking levels. Proposed work has jumped, municipal bond markets are continuing to show robust activity, and public demand for new and improved sanitary and water facilities is sharp in some areas.

Sewerage is expected to pass the $400-million mark for the second time, with Middle Atlantic, Middle West and Far West areas providing the market for greatest volume.

The Pittsburgh-Allegheny County program of sewers and treatment facilities alone will account for $70 million in construction as its share of the cleanup of the Ohio River. It is expected that a 1955 start on this program will provide impetus for similar work by the smaller cities along the Ohio and its tributaries.

Waterworks construction should exceed $250 million under pressure of public demand after the drought conditions of 1954, combined with the rise in population growth and increasing water use.

- **Sewage Disposal**—Although annual sanitary works construction has maintained a steady pace of high activity, current rates of spending leave us more than $100 million short of the yearly expenditure necessary to provide our cities with adequate collection and disposal of their domestic and industrial wastes. Since it is unwise to count on such a general increase in spending for construction or improvement of sewerage works, the problem as it confronts the engineer in this field is rigidly defined: By what means can he furnish all plant and sewers necessary to stay ahead of the mounting need at a cost of less than 80% of estimated necessary outlay?

Here are some techniques recently developed that show signs of solving at least part of the problem:

1. The Laboon Process—1954 saw start of construction of the first practical application of the process of concentration of sewage sludge by flota-

GARVEY RESERVOIR, storing 1,500 acre-ft, and built at a cost of $3.9 million, will go into service early in 1955. It is part of a $75-million expansion program for the Metropolitan Water District of Southern California.

The Thicker the Coat the better the protection!

PITT CHEM®
Tar Base Coatings
are up to
10 times as thick

as ordinary paints

ORDINARY paints and coatings may look like they're doing a good job in your plant. But if they're under 5 mils thick, tests show that they'll probably fail within months in a corrosive atmosphere. It takes a thick, tough, durable protective coating to positively control industrial fumes, spillage and atmospheric corrosion. And that's exactly what you get when you specify Pitt Chem Tar Base Coatings.

Pitt Chem Coatings are formulated from coal tar pitch for only one purpose—to stop corrosion. They're tough. They're durable. And their applied coat is up to 10 times as thick as ordinary paint.

Let us show you how little it will cost you to do a really effective job of protecting your tanks, buildings and industrial equipment against costly corrosion. Call for a Pitt Chem survey today.

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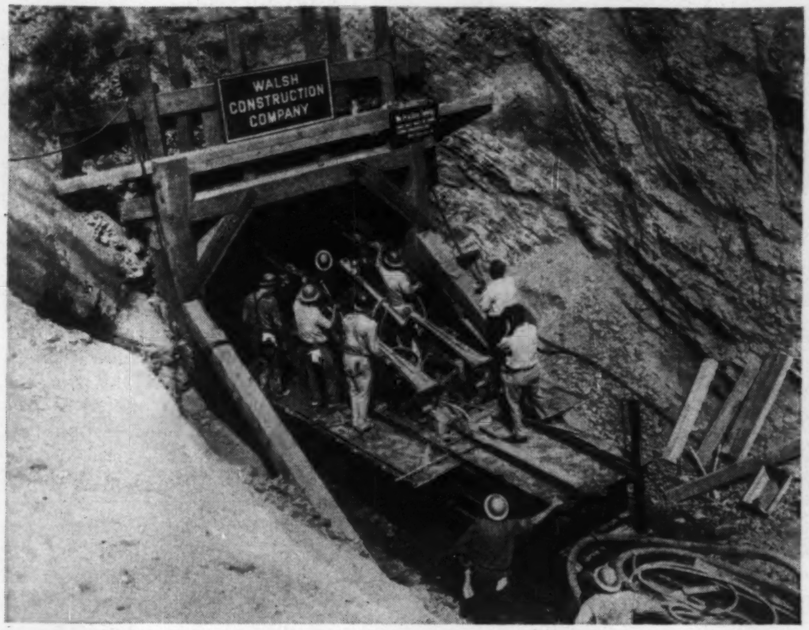


DRILL JUMBO starts work on the 1.3-mile, 10-ft-dia, San Juan Tunnel that is scheduled to serve Colorado River Aqueduct Water to Orange County and Southeastern Los Angeles County.

tion under controlled temperatures. The process developed by John F. Laboon, chairman of the Allegheny County (Pa.) Sanitary Authority, was proved efficient in pilot operations and will be used at the new $17.6-million, 150-mgd plant now ready for a start in the Pittsburgh area.

A smaller plant (11 mgd) in Charlotte, N. C., however, is off to an earlier start and will be finished before the Allegheny County-Pittsburgh plant begins operations. Four sludge concentration tanks, each with a 6,700 cu ft capacity, will serve an equivalent population (BOD basis) of 245,000. Each tank is slated to take raw and excess- activated sludge from one day's operation on a fill-and-draw basis, with detention time set for two or three days. Sludge at 12% concentration will be pumped to digesters. Odor, a problem in the process, has been overcome through closure of the system.

2. High-rate digestion of combined raw and activated thickened sludge was proved to be exceptionally efficient during the year, when plant operators of New York City's Public Works Department deliberately loaded a part of the Bowery Bay installation to failure during a 200-day test and found that the modified plant was capable of better than adequate digestion at a design capacity of 0.5 cubic feet per capita as compared with four to five cubic feet in some conventional plants. Torpey's recommendation for future plants using the Bowery Bay Principle is five days detention with two tanks in series, or 0.4 cu ft per capita.

3. Regional programs have been gaining popularity, with several municipalities joining efforts in coping with collection and disposal problems. One of the latest of these was inauguration in August, 1954 of the Fairfax County (Va.) Board of County Supervisors' attack on problems in that area. Savings are claimed through lack of duplication necessary where each individual community goes it alone.

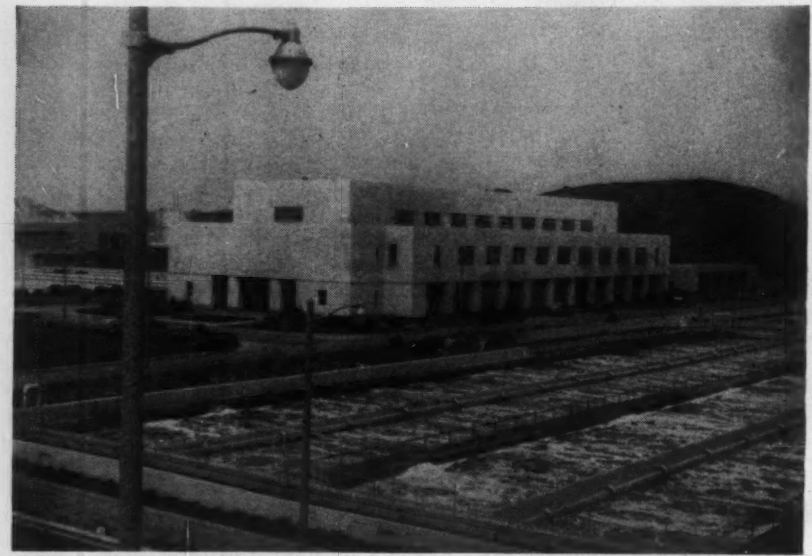
4. The use of long ocean outfalls to provide dilution at sea of the products of primary treatment plants has been tried to eliminate the secondary treatment facilities. Advocates claim savings both in capital costs and operation, but opponents warn that costs incurred in construction of the outfall lines might prove completely wasted if subsequent tests indicate beach pollution of recreational areas, thus requiring construction of secondary treatment facilities after all.

From these developments one might also conclude that 1955 looms as a year that promises lots of controversy swirling around proposed cost saving ideas, rigid testing of recently accepted theories of design currently under pilot programs, and the proving —under practical plant conditions—of several new concepts in sewage plant operation.

• **Industrial Waste Disposal**—Perhaps the most significant development in disposal of industrial wastes is the fruition of many years of study, research and pilot operation aimed toward activated sludge treatment of complex organic wastes of pulping mills. Last year, through cooperative efforts of leaders in the pulp and paper industry and public agencies, the first such plant went into construction for the West Virginia Pulp and Paper Co. at Covington, Va.

The West Virginia company, under guidance of the industry's National Council for Stream Improvement, operated a pilot plant for a period of

LARGEST PRESTRESSED TANK is stressed by lapped, quarter-circumference cables rather than more conventional wire wrapping. The 12-mg tank, built by East Bay Municipal Utility District, is located at Richmond, California. Richmond-San Rafael Bridge construction is in background.



HYPERION TREATMENT PLANT, in Los Angeles, continues as controversial issue in that city—treatment plant may be revamped from complete treatment to primary treatment with long ocean outfall.

two years before taking steps last year in construction of their new $1.5-million, 16-mgd activated sludge plant.

The process, as finally selected consists of:

1. Primary sedimentation
2. Aeration of waste water mixed with biologically active sludge
3. Separation of sludge from liquor by sedimentation
4. Return of settled biological sludge to be admixed with raw waste.

This development looms with prime importance, not only because of rapid tautening of minimum standards of stream quality, but because proper treatment of these highly pollutant wastes will return many millions of gallons of usable supply to some of our major streams.

In keeping with the trend of industry toward making itself more acceptable as a neighbor—even to the point of being sought after—is the program announced by the Ford Motor Co. for its Rouge Plant at Dearborn, Mich. Its $1-million waste treatment plant will consist of grit chambers with a 1000-ft force main to clarifiers, sludge collectors and lagoons. The plant will eliminate the discharge of 80 mgd of raw plant wastes that enter the River Rouge through an 8-ft sewer.

Carrying its share of the trend, American Cyanamid Co., is carrying on an ambitious experimental program in treatment of its chemical wastes. Most important is its New Jersey pilot plant operating currently for the purpose of getting the most out of the company's ⅔ share of expense for a $7.75-million trunk sewer, treatment plant and storage program planned by the Somerset-Raritan Valley Sewerage Authority, whose efforts may parallel a $22.5-million county-wide joint disposal program being laid out by the Middlesex County Sewage Authority downstream.

• Water Purification and Supply — Perhaps as much an industrial waste effort as one concerned with water supply, treatment of radio-active wastes is receiving a good portion of the attention of scientists in private and public service. It is difficult to anticipate the potential polluting power of nuclear reactors, but 1954 saw unprecedented activity in the field of treatment of these wastes. Long detention periods and trickling sand filters have been offered as possible methods for water supplies at very low degrees of contamination, but truly economical and effective methods of treatment have not been divulged if, indeed, they exist. It is a solid gold prediction that a rigid balance of private development of atomic energy and urgency for adequate treatment of contamination resulting therefrom will concentrate more and more research effort on the atomic wastes question.

• Drought fosters construction—Pressures for construction of storage facilities in drought areas will account for a good portion of the $250 million that probably will be spent on reservoirs, storage tanks and treatment installations this year. The hard pressed section of the south-Atlantic, mid-western and far south-western areas already are reporting new contracts let for relieving thirsty communities.

Reclamation of sewage effluent is playing an increasingly important part in supply shortage relief, especially in the far west. Much of the reclaimed waste water is being used for irrigation, some is being used by industry and in still other instances treated effluent is being returned to recharge groundwater.

Major Water Supply and Sanitation Projects

• Baltimore—The stream control gate on the **Liberty Dam** was closed July 22, 1954, and as of Dec. 1, the impounded water in the reservoir on the Patapsco River had reached an elevation of 85 feet above the foundation—75 feet below dam crest. All bridges and two state highway routes have been relocated.

Ashburton Filtration Plant: This $11.6-million, 120-mg plant is approximately 60% complete with work progressing ahead of construction schedule.

Montebello Chlorinator Station: Started on May 3, 1954, work on the master chlorinator station at Montebello Filtration Plant is about 50% complete.

• Boston (Sewerage)—On Sept 9, holing through of the **North Metropolitan Sewerage Tunnel** added another milestone in Boston's $75-million sewerage program. The four-mile, 10-ft-dia tunnel is one of two that will convey sewage to the planned 800 mgd **Deer Island Treatment plant** on which construction is scheduled to start in 1955.

• Boston (Water)—Completed and under test early in 1954 was the 8-mile, 48-in. steel pipeline from the **Blue Hills Reservoir** to the city. It was placed in service during the year. Substantially completed also, was the 7-mile, 10-ft-dia $11.9-million **City Water Tunnel Extension.**

• Chicago (Water)—Way was cleared in October for resumption of Chicago's 960-mgd, $85-million water filtration plant to serve more than 3 million people. Legal difficulties halted construction of a $6.6-million cofferdam in Lake Michigan until a July 26th reversal of a Circuit court decision. Work has been resumed on the $15 million worth of tunnel construction.

• Chicago—This year the Chicago Sanitary District expects to award five big sewer contracts totaling $7 million; six sewage treatment plant contracts for $2.6 million; and a contract for an administration building, costing in the neighborhood of $1 million. Biggest contract awarded last year was $1.5 million for 12,800 ft of 7½x8½-ft intercepting sewer. Ten

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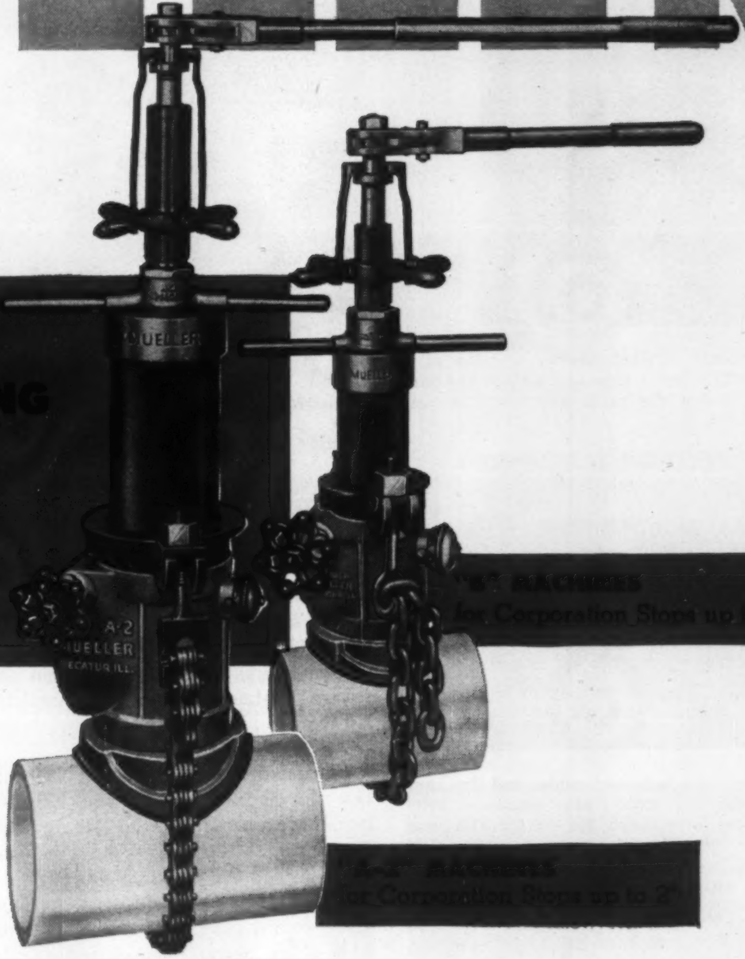

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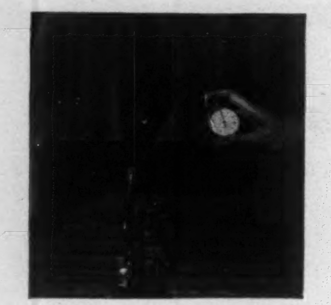
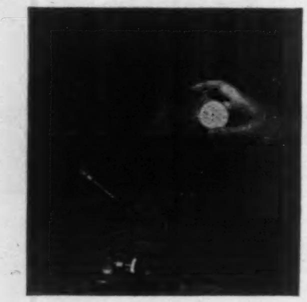


A blow-torch applied directly to edge of a Resolite Fire-Snuf translucent structural panel slowly ignites the resin and small flames appear.



The blow-torch is turned aside, and five seconds (note stop watch) after source of heat and flame is removed fire on the Fire-Snuf panel is self-extinguished.

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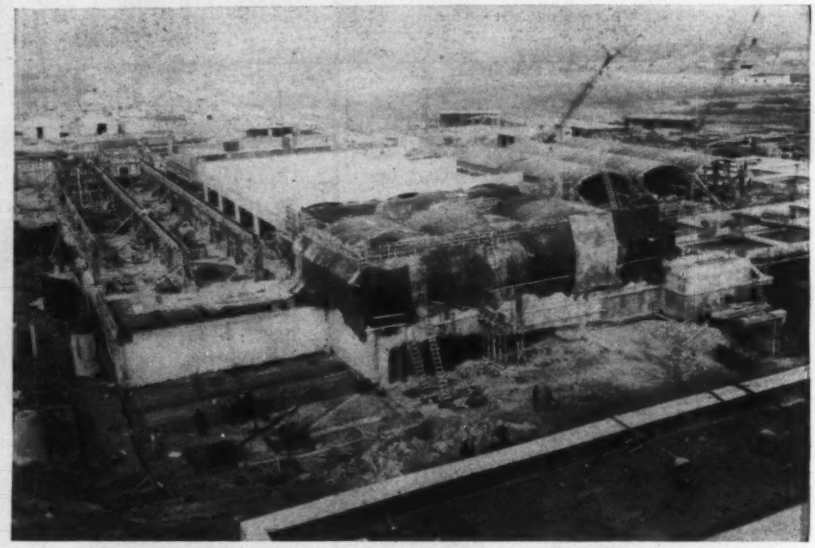

THIN-SHELL ARCHES for Detroit's 200-mg Northeast Station water treatment plant were 50% completed in 1954. Rolling forms were laminated timber.

smaller contracts awarded last year for miscellaneous construction and installation of sewage treatment machinery added up to $1.3 million. And nearly $4.5 million worth of sewer construction and sewage treatment works was completed last year.

• **Cincinnati**—Contracts totaling $6.9 million will be awarded this year for additional construction in the Metropolitan Cincinnati Sewage Disposal program. They include the construction of incinerators, sludge disposal, elutriation and conduits, costing about $4.8 million, for the **Mill Creek Sewage Works.** Also $2.1 million of tunnel construction for 5-, 6-, and 8-ft dia sewers of the **East Branch Ohio River** interceptor. Two tunnel contracts totaling $850,000 were awarded last year for 30-in. dia sewers in the **West Branch Ohio River** interceptor. A $1.8 million contract for the Mill Creek outfall and diversion sewer, and Section No. 1 of the West Branch Ohio River interceptor was 75% finished at the end of 1954.

• **Cleveland**—A $5.2 million contract for aeration and final settling tanks, begun in 1953, was 96% finished at the end of 1954. Contracts to be awarded this year include $2 million for additional sludge filters, incinerators and buildings at the city's **Southerly Sewage Treatment Plant;** also $100,000 for sludge pumps, valves and piping. At the **Westerly Sewage Treatment Plant** about $600,000 will be spent this year for detritors, pre-aeration tanks and blowers.

• **Denver**—During 1955 the Board of Water Commissioners for the City and County of Denver expects to award nearly $5 million of construction contracts. Biggest single project will be an extension of the city distribution system, to cost about $1.2 million. Other large contracts to be awarded this year include: Adding 56 mgd of capacity to the **Moffat Filter Plant,** $900,000; about 25,000 ft of large conduit, $900,000; constructing **Hillcrest Reservoir** with a 10 mg capacity, $580,000; and about $600,000 for 14,000 ft of 36-in. and 72-in. conduit to the Hillcrest Reservoir. Nearly $2 million of water supply and distribution construction was completed during 1954, and $14 million of construction was still in progress at year's end.

• **Detroit Sewerage**—Contracts totaling $9.5 million were awarded last year by the Department of Public Works for construction in the city's sewer program. Contracts completed last year totaled $5.9 million, while $3 million of sewer construction and allied work are expected to be put under contract this year. This year's program includes: 7,200 ft of small diameter sewers and two small pumping stations in the **Belle Isle** sanitary sewer system to cost about $200,000; 650 ft of 10x10 ½-ft double box sewer, to cost $900,000, in the 8.5 mi. **First-Hamilton** storm relief sewer; about $800,000 for sewers and $1 million for pumping station in the **Southwest District** to serve a low lying area in the southwestern part of Detroit which requires pumping to give adequate storm relief.

• **Detroit (Water)**—Four contracts totaling $2.9 million were awarded last year by the Department of Water Supply for additional construction of the 200-mgd **Northeast Station** water treatment plant. The largest one, totaling $1.9 million for the chemical building and miscellaneous structures, is 60% finished. Two contracts totaling $568,000 were completed last year for water mains in the **West Eight Mile Road.** They included 8,470 ft of 48-in. and 2,800 ft of 54-in. steel cylinder reinforced concrete pressure pipe.

At the close of 1954, a $3.7 million contract for settling basins and chemical building foundation at Detroit's Northeast Station was virtually finished. The $2.3 million low-lift plant structure was under construction and an $8 million contract for the filter building, weir chamber, wash water building, switch house and office building, was 50% finished. Three contracts totaling $660,000 for valves, valve operators, electric power transformers, storage battery charging equipment, and a substation were completed.

Contracts proposed for award during 1955, in connection with the Northeast Station and new transmission mains, include: High lift structure, $1.7 million; 16,000 ft of 54-in. steel cylinder reinforced concrete pressure pipe in **Greenfield** and **Schaefer** roads, $1.4 million; rerouting 2,700 ft of 48-in. pressure pipe, $160,000; pre-chlorination building, $550,000; electric motor driven pumping equipment, valves and valve operators, $1.2 million.

- **Fort Worth (Sewerage)**—Plans are practically complete and construction is expected to begin early this year for a 5-mgd sewage treatment plant, estimated to cost $1.2 million. The first portion of a new collector main to the new treatment plant—containing 36-in., 39-in., 48-in. and 60-in. pipe and estimated to cost $400,000—will be advertised for bids as soon as right-of-way negotiations are complete. Initial construction contracts also will be awarded this summer on a new 66-in. and 72-in. collector main to the city's present treatment plant. Estimated cost is $1 million. About 40 to 50 miles of miscellaneous laterals and sub-mains also will be constructed this year on smaller contracts.

- **Fort Worth (Water)**—A $1.2 million contract awarded last year for the construction of water mains is about 60% finished. An additional $260,000 was also spent on water plant improvements. This year the Water Department will spend $500,000 on new mains. And construction is expected to get under way during 1955 on a proposed new water treatment plant, estimated to cost $5.5 million. A proposed new water works revenue bond issue, to be put to a vote this summer, will, if approved, have a definite bearing on the Water Department's capital improvement program.

- **Kansas City, Mo.**—By the summer of

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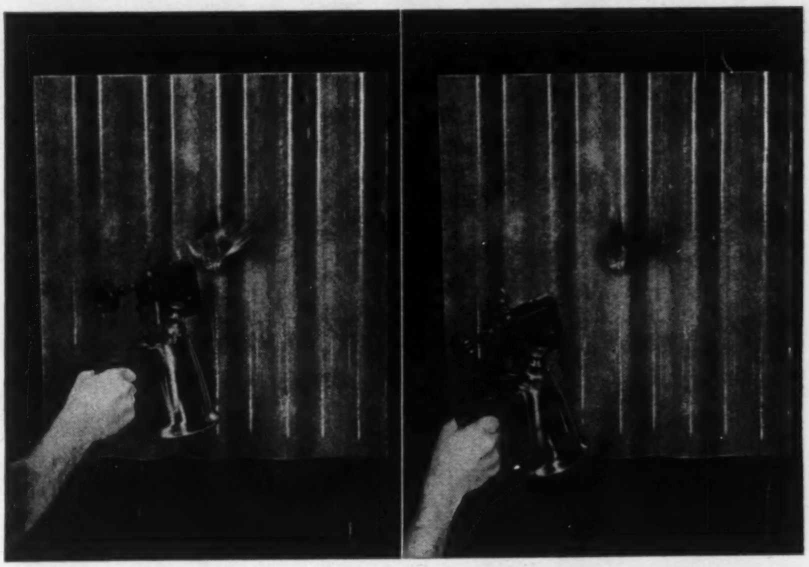

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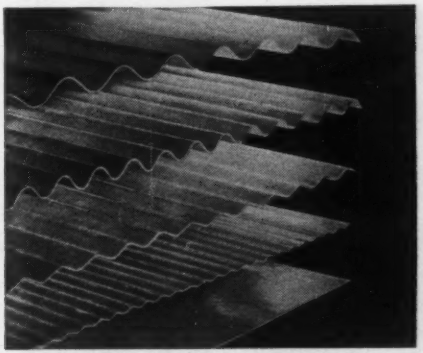

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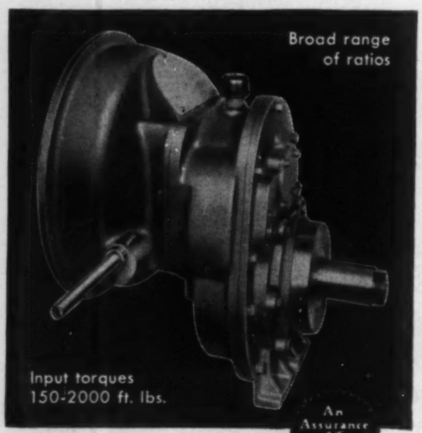
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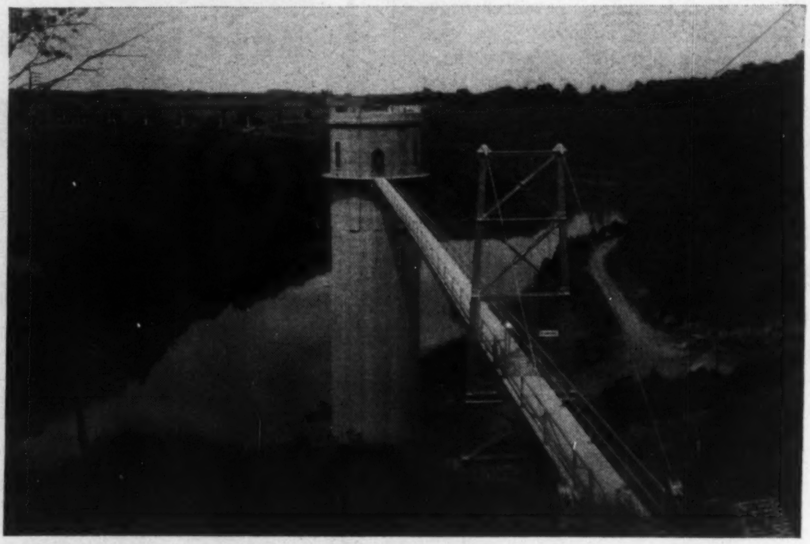


GATEHOUSE TOWER over 10-ft-dia tunnel that conveys water from Liberty Reservoir to Baltimore. Aluminum suspension bridge is used as walkway.

1956 the Water Department's main treatment plant north of the city will be ready to produce at a rate of 210 mgd. It is being enlarged from 120 mgd at a cost of $15 million. Of this amount, about $4.3 million was contracted for last year and $3 million will be contracted for this year. The present 135-mgd steam-operated **Turkey Creek Pumping Station,** which was overflowed by the 1951 flood, is being abandoned in favor of a new electrically-operated pumping station on an adjacent flood-safe site. It will have 210 mgd of installed capacity, with space for another 30 mgd unit. Land and equipment were purchased last year at a cost of $1.8 million. The pumping station with a 15-mg reservoir, which is expected to cost about $3.7 million, will be contracted for this year. A $1.5 million contract awarded last year for 15 miles of 36-in. to 24-in. steel reinforced concrete force main to serve a new industrial airport about 15 miles northwest of Kansas City, will be completed this year.

- **New Orleans, La.**—One of the largest projects to be undertaken this year by the Sewerage & Water Board will be the erection of six steel ground-storage water reservoirs, each having a capacity of 3½ mg. Total cost of the six tanks will be $700,000—about $187,000 for foundations, and $513,000 for the tanks and the erection. Contracts also will be awarded this year for purchase and installation of 3,400 ft of 50-in. water main, 3,600 ft of 30-in. main and 1,400 ft of 20-in. main. Total cost of the project, to serve a new industrial area on the eastern edge of New Orleans, is estimated to be $328,000. Last year 12 mi of 6-in. water mains were completed at a contract cost of $286,000, as well as $230,000 worth of high rate water treatment units at the **New Orleans Water Purification Plant.** A $525,000 contract for modification of the plant and installation of mechanical mixing equipment was 87% finished at the end of 1954. And a $658,000 contract for installing 29,000 ft of 50-in. water main, plus 3,400 ft of 30-in. branch main, was 60% finished.

- **New York City (Sewerage)**—Substantial completion during 1954 of the first phase, and the start of the second phase of construction marked the progress of the city's pollution control program. The first stage of the **Port Richmond Treatment Project,** Staten Island, was completed.

Work performed in construction of treatment facilities on contracts awarded during and prior to 1954 totaled $15 million, as compared with $6.7 million in 1953. Contracts awarded for pollution control represented about $31.3 million as compared with $16.8 million in 1953.

Contracts for the expansion of the **Bowery Bay Treatment Plant,** Queens, and for the **Oakwood Beach Treatment Plant,** Staten Island, were awarded near the end of the year at a total cost of $17.7 million. Completion of the Oakwood Beach plant in 1956 will mean that all sewage originating in the city and affecting its recreational waters will be receiving treatment. Completion of the **Bowery Bay Control Project** will extend the benefits of sewage treatment to part of the lower East River, now taking 50 mg of raw sewage each day.

The final step in cleaning up the lower East River will be the **Newtown Pollution Control Project,** a $60-million, 280-mgd plant that will receive a $14.3-million contract-award kickoff this year.

——Water supply and sanitation

Potential savings of $25 million in sewerage construction were realized during the year through development of a plan to build a small primary treatment plant on the Hudson River to eliminate an expensive hard-rock tunnel to the Wards Island Plant as originally planned.

The second phase of the pollution control program involves design and construction of $175-million worth of projects. In addition, the Division of Sewage Disposal—which is assigned this responsibility—is engaged in a program of incinerators and marine loading stations for the Department of Sanitation aggregating about $65 million.

Process Improvements—Decision to use a combined step activated sludge and activated aeration process for the entire **Wards Island Plant** was reached in 1954. The process, developed in 1953 by a department engineer, was used as a temporary installation and has produced effluents of higher quality than modified aeration process at lower costs for air diffusion.

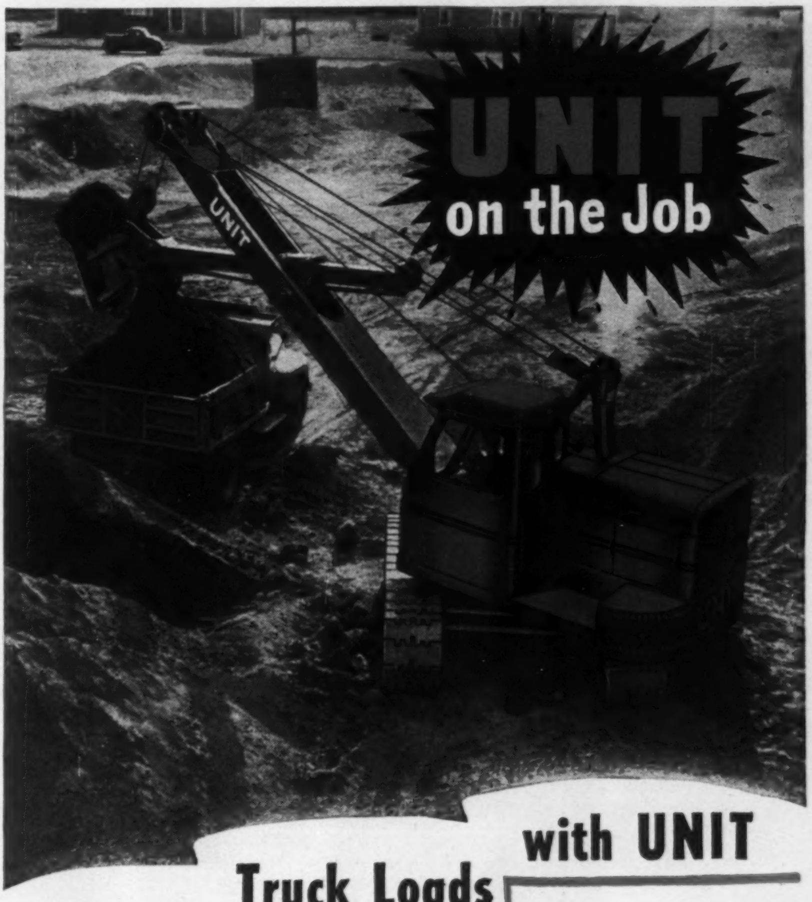
The new process of thickening combined primary and activated sludge, in use for three years at the Bowery Bay plant, also has been adopted for Wards Island. Results of the Bowery Bay tests indicate a decrease in daily sludge volume to sea of about 30% even with improvised use of final settling tanks for the settling process.

• **New York City (Water)**—On June 7, 1954, the Board of Water Supply obtained its long sought permission to proceed with development of the third stage of its **Delaware River Supply** through a favorable Amended Decree of the Supreme Court of the United States which permits a total diversion of 800 mgd.

Under the provisions of an earlier decree (1931), permitting diversion by the city of 440 mgd from the Delaware Watershed, the board has been completing the first two stages of the Delaware Supply involving divisions from its **Neversink Reservoir** on the Neversink River, and from its **Pepacton Reservoir** on the East Branch of the Delaware River into its **Rondout Reservoir** at the head of the Delaware Aqueduct, which supplies the city. The Neversink diversion was accomplished on January 1, 1954, and has been under operation throughout the year.

Although no diversion has yet been made from the Pepacton Reservoir, the final stage of construction is in progress with the plugging of the stream control conduit at the Downsville Dam. The work of relocating public utility lines and cemeteries in the reservoir area is practically completed. Impounding in the reservoir commenced September 15, 1954.

In advance of rising water, work has progressed on the construction of substituted state highways. As a part of the



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highway network, the board has completed the construction of a new Shavertown Bridge—five spans of girders, the largest of which is 225 ft. During the year, the 25-mile East Delaware Tunnel from Pepacton Reservoir to Rondout Reservoir has been practically completed, ready for use.

Under the provisions of the Supreme Court decree, the city now can divert 490 mgd from these two reservoirs and it may also—upon completion of its proposed **Cannonsville Reservoir** on the West Branch of the Delaware river—divert an additional 310 mgd for its total allowed 800 mgd.

- **Philadelphia (Sewerage)**—The $80-million sewage collection and treatment program for elimination of dry weather sewage flow to streams and rivers was, at the end of 1954, 72% complete as measured by contracts complete or awarded. During 1955, contracts for $9.8 million—approximately 12% of total program—are scheduled for award.

A $25-million portion of the program allocated for construction of three sewage treatment plants was about 85% complete, while a remaining $55-million portion slated for collecting and intercepting systems was 67% completed.

Sewage collection and treatment in the **Northeast Sewage Disposal District,** for which the program totals $23 million, is 72% complete. Treatment facilities are under operation and the intercepting systems are being extended to new areas. $1.7 million in contracts for this section will be awarded in 1955.

In the **Southeast Disposal District,** with $19 million in program allocations, work is 77% complete. During 1955 $3.8 million in contracts will be awarded. Emphasis in this district will be on operation of the **Southeast Sewage Treatment Works** in the coming year. Also programmed, with design work substantially completed in 1954, is $1.6 million for the Lower Delaware Collecting System, main tributary sewer to the Southeast Works.

In the **Southwest District,** representing $38 million of the program, work is 71% completed. The program in this district for 1955 covers contracts estimated at $4.3 million. Largest item in the early scheduled $3.3 million worth of collecting and intercepting lines is the $1-million **Lower Schuylkill East Side Intercepting System** along the east bank of the Schuylkill River.

The sewers and drainage program, covering sewers for new housing, sewers for relief of unsanitary conditions, sewers to permit paving and reconstruction of old sewers, accounted for $8.1 million in 1954 spending. In 1955 $8.9 million is scheduled for award, with the largest single item of approximately $4 million slated for sewers for new housing.

SAN DIEGO AQUEDUCT went into full 170-cfs operation late in 1954, with completion of a second barrel. It is a 71-mile pipeline — mostly concrete — connecting the San Diego area with the Colorado River Aqueduct.

- **Philadelphia (Water)**—Replacement of mains, reinforcing of aims and extension of the system accounts for $2.7 million in contracts awarded in 1954, with approximately the same amount budgeted for expenditure in 1955.

The $50-million waterworks program for purification, pumping and storage was, at the end of 1954, 46% complete as measured by contracts completed or awarded. During 1955, 22% or $11.6-million worth of work is scheduled for award.

The portion of the waterworks program for purification plant totals $31 million with approximately 53% completed at the end of 1954. Pumping station allocations, totaling $9 million, have been approximately 67% depleted as of Dec, 1954. Some $10 million worth of reservoirs and storage facilities were approximately 9% complete as the year ended.

The $48-million **Storm Flood Relief Program,** made up of projects to relieve flooding in times of storm by construction of alternate or larger drainage facilities at the end of 1954 was 29% complete, based upon contracts complete or awarded. During 1955 an amount of $970,800 has been budgeted. Largest single item in the coming year's activity is a $680,000 **Frankford Creek Flood Control Project.**

- **Portland, Me. (Water)**—During 1954, the **Portland Water District** completed construction of a 12-in. submarine, ball and socket pipeline from Veranda Street in Portland to Andrews Ave., in Falmouth —a distance of 2,600 feet.

Laying operations were begun on a 48-42-36-in. fedder line from Warren Ave., in Westbrook to Route 1 in Falmouth. 15,300 feet of 48-in. pipe was in place at the end of the year. Operations will continue in 1955 with an estimated 700 feet of 48-in., 4,800 feet of 42-in. and 17,000 feet of 36-in. pipe scheduled to go in.

Reconstruction of its distribution system along the route of the **Portland-Augusta Turnpike** was accomplished, together with removal of many 8-in. laterals to allow for construction of bridges. Bypasses were required for the new structures within the turnpike right of way.

Another submarine crossing was accomplished with 30-in. ball and socket cast iron pipe across the Presumpscot River in Falmouth to tie in with the 36-in. portion of the **Westbrook-Falmouth** Feeder. Three feet of cover was maintained on all submarine lines.

Left-over construction work on the feeder and distribution line will constitute a major portion of the district's work in 1955.

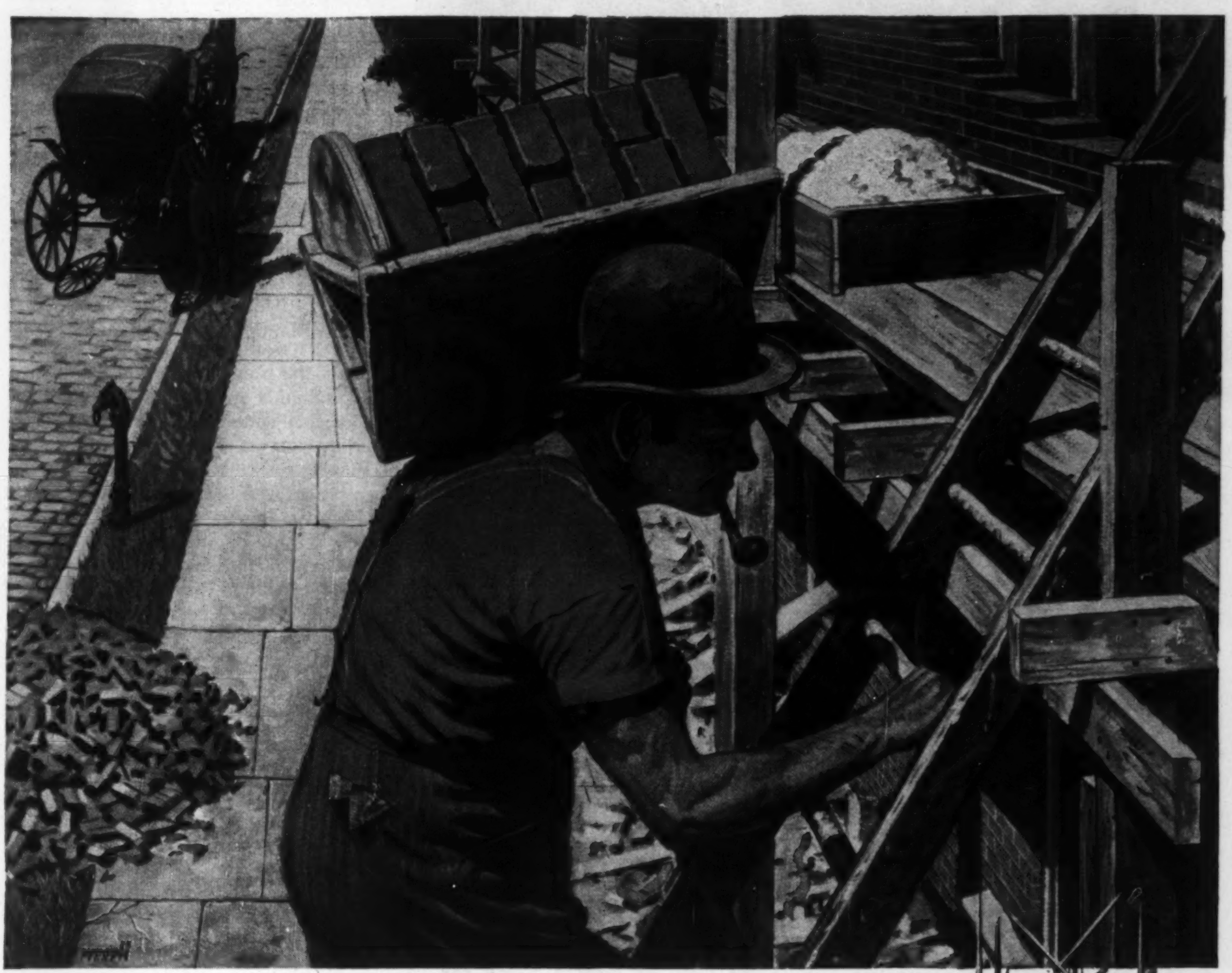
- **Providence**—Following completion of phase I ($6.1 million) of **Blackstone Valley Sewer District Commission's** sewerage project in 1953, work was launched on Phase II.

Under this portion, plans were completed and contracts awarded for $1.4-million worth of intercepting sewers. Sewer extension work—20% completed—included 6,000 lineal feet of 48-in. sewer, (5,000 feet of which was in deep tunnel), and 14,000 feet of 10-in. to 48-in. sewer appurtenant work. Plans are in the completion stage for further extension of the interceptors, contracts to be awarded in 1955. Work contemplated in this phase should carry the program into late 1956 or early 1957.

- **Roanoke, Va. (Water)**—1954 saw completion of preliminary plans for three rapid sand filters, each with a capacity of 2 mg each. Additions are being planned for additional mixing and settling basin capacities for the system.

Location of a General Electric plant halfway between Roanoke City and the Town of Salem resulted in a commitment during the year for laying of 11,000 feet of 12-in. cast iron water main to serve the plant.

- **Tampa (Sewerage)**—Extension of the sewage collection system and sewer im-



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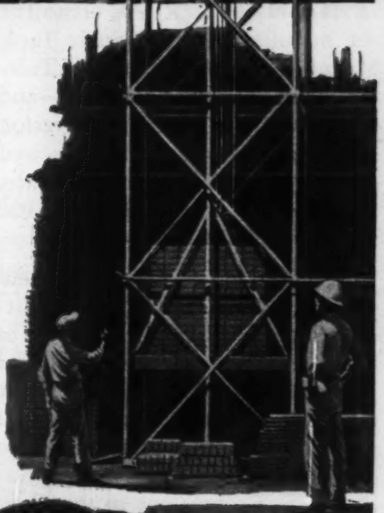

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provements to accommodate areas annexed to the city in 1953 resulted in a 1954 sale of $10 million in sewer revenue bonds that will be retired by income received through sewer service charges. This brings to $22 million the value of bonds sold for sewage disposal since 1950.

Construction planned includes approximately 18 miles of trunk and intercepting sewers, 150 miles of lateral sewers, 20 pumping stations, 4.5 mi of force main and two river crossings. These facilities will discharge through existing city facilities to its treatment plant. No enlargement of the plant is contemplated at this time inasmuch as provision was made in the original design to receive the sewage from the annexed areas.

Bids have been received on four pumping stations and 6.5 miles of trunk and intercepting sewers. Bids for approximately 35 mi of lateral sewers will be received soon and the remainder of the planned extensions will be advertised as rapidly as design is completed.

• **Tampa (Water)**—Water supply and distribution facilities owned by the city have been supplemented and extended to serve the rapidly growing new areas within the city. A two-year program of improvements is practically completed at this time including (1) Increased filter plant capacity ($674,000); (2) additional pumping facilities ($260,000); (3) elevated storage ($257,000); (4) additional supply mains, 12-in. to 36-in. ($2,000,000).

Total cost of program is set at approximately $3,191,000, of which $1.6 million is considered 1954 expenditure.

• **Tampa (storm drainage)**—Projects in pipe sizes to 54 inches, providing drainage improvement for about 400 acres was constructed during 1954, at an approximate cost of $0.75 million.

• **Wilmington, Dela.**—Completed late last year was the $16-million **Wilmington-New Castle County** joint sewage disposal system. Only two county lines are still in the construction stage—those serving the Holly Oak to Stockdale section north of Wilmington and the Farnhurst to New Castle County Airport main from city limits south. Placed in operation in October was the final major facility, the $3-million **Cherry Island Marsh Treatment Plant,** served by an 84-in. force main from the mainland.

• **York, Pa.**—Completion in 1954 of a $4.7-million activated sludge treatment plant marked the conversion of old and outmoded Imhoff tanks for use as preaeration and primary settling tanks. New plant is designed for a 12-mgd average flow, with maximum flow through secondary units of 18 mgd.

——Water supply and sanitation

• **East Bay Municipal Utility District**—More than $5 million was spent on major construction projects during 1954 by this water utility headquartered in Oakland, Calif. Most expensive project was $1¼ million, 51-mg **South Reservoir,** which was 11% complete by year's end. Most interesting single project was a 12-mg prestressed concrete tank using cables rather than wire wrapping. Other larger reservoirs were roofed using precast concrete members.

• **Lake City, Wash.**—The **Lake City Sewer District** just north of Seattle last fall voted $6 million for continuation of a sewer construction program contingent upon construction of a treatment plant by the City of Seattle.

• **Sacramento**—A $5.5 million, 54-mgd sewage plant for the Sacramento metropolitan region was completed during the year. The plant eliminates the necessity of dumping raw sewage into the Sacramento River. The project was financed by a $4.4 million local bond issue supplemented by a $1.1 million allocation from the state. It is expected to accommodate the anticipated flow of sewage from Sacramento and a half dozen suburban district until at least 1970.

• **San Francisco**—Contracts totalling $2.6 million for three segments of the Sunset supply line were completed during 1954. The 20-mi. line, which will bring water from **Crystal Springs Reservoir** on the Peninsula to **Sunset Reservoir** in San Francisco, is slated for completion by January, 1957. About 75% of its length is completed. The 50 mgd line consists of 60-in. pipe along most of its length. A 14 mg reservoir—**Summit**—is slated for completion in January, 1955. The $577,000 reservoir is highest in San Francisco.

• **Seattle**—Engineering work was started in 1953 by the **Southwest Suburban Sewer District** for a $5.8 million sewer system in an area adjacent to the city. Contracts for work costing an estimated $2 million are scheduled for award this year.

• **Honolulu**—Honolulu has let contracts amounting to $16 million for 105 sewerage projects since 1947, 9 of which are still under construction at a cost of $2 million.

The proposed schedule for sewerage construction calls for 14 projects at $4 million during 1955; 6 at $2 million in 1956; 5 at $2 million in 1957; 5 at $2 million in 1958; and 5 at $3 million in 1959.

For the period from 1960 to 1982, the sewerage program envisions at least 80 more construction projects totaling over $55 million.

(Continued on page 150)

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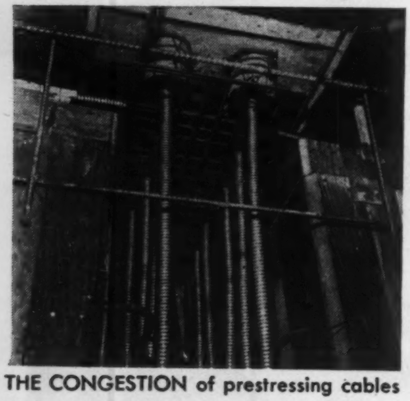
• **Concentration of load** on the cable anchorage by stressed cables makes the area around the cones the most crucial area. Because patching of concrete in this area of cast-in-place prestressed concrete could scarcely be tolerated, consolidation of the concrete in this area is particularly important.

• **Guy F. Atkinson Company,** contractor, used Viber 1-5/16 and 1-3/4 inch diameter vibrators. Model E electric motor driven vibrator 1-3/4 inch diameter was used at the base of cone, or where spacing would allow, the 1-5/16 inch diameter Model 26 was used between cones as well as at the base of cone.

For further information on Viber's complete line of internal and external vibrators, contact your authorized distributor or Viber Company, Dept. 67, 726 South Flower Street, Burbank, California.



THE CONGESTION of prestressing cables and cones at the point of maximum load requires top performance from vibration equipment.

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Water supply and sanitation

1954 construction and most 1955 construction is for the building of new sewers. However, a $300,000 contract will be let in 1955 for the start of a sewage treatment plant to serve the Kaneohe suburban area.

• **Southern California (Water)–Metropolitan Water District** of Southern California is engaged in a $75 million expansion program, begun in 1952, that includes additions to the **Colorado River Aqueduct** and its distribution system. Pumping plant expansion was under way with two additional 90,000-gpm units to be provided at each of the five pumping stations.

The $3.9 billion, 1500-acre-ft, **Garvey Reservoir** was nearly completed in 1954. Feeder line work included completion of the 1½-mile, 10-ft dia **Cajalo Tunnel** and 4000 ft of excavation on the 1.3-mile, 10-ft dia **San Juan Tunnel.** Also, $5.8 million was spent on the middle feeder system (connecting with Garvey Reservoir). And $2 million was used for extensions to cross feeder pipelines ranging from 42 to 78 in. dia.

Meanwhile, the **Los Angeles Department of Water and Power** is well along on the $6.4 million, 10-mile, **Eagle Rock-Hollywood Pipeline** that will be completed in 1955. The 171-mgd, 68-in. conduit provides Los Angeles' first major connection with the Colorado River Aqueduct.

And the **San Diego Aqueduct,** second barrel of a 71-mile line connecting San Diego with the Colorado River Aqueduct, was completed in October and placed in service. The $16.5 million project, built by the U. S. Bureau of Reclamation under Navy jurisdiction, was accepted in November by the **San Diego County Water Authority,** which serves distribution agencies in the county with water provided by the Metropolitan Water District. The aqueduct capacity now totals 170 cfs.

The San Diego City water department in mid-1954 completed **Sutherland Dam** on **Santa Ysabel Creek** 20 miles east of San Diego. A multiple arch dam, it was started in 1927. Work halted in 1928 for lack of funds. The project was resumed in 1952 under a $3 million contract. The project cost, including **Black Mountain Tunnel** and pipeline to deliver water to distributing reservoirs cost $6.5 million. The 161-ft high dam will impound 29,000 acre-ft of water.

• **Spokane, Wash. (Sewage)**–Spokane hopes to call bids early in 1955 and build a $1.5 million sewage disposal plant in the northwest section of the city to complete its $4.7 million disposal project. By summer contracts should be let on three pumping plants. During 1954, the last major interceptor was completed. The disposal plant, once delayed by changed design, will enable the city of 176,000 to treat about 80% of its sewage.

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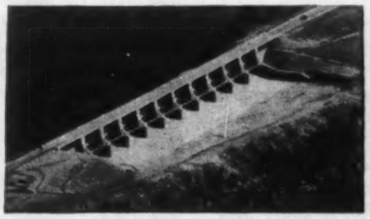
That's only part of Logan's story. But it's mighty important—and it may become part of your story when you start using the Cities Service line of highest quality petroleum products. Learn the whole profitable story. Contact your nearest Cities Service representative or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Machines, machines, and more machines! W. E. Logan & Sons uses as many as 84 pieces on a single job, all Cities Service fueled and lubricated. Many use Cities Service Hydraulic Oils, too.



The Tenkiller Ferry Dam Reservoir in Oklahoma was one of Logan's biggest jobs. An earthen dam, it required moving 10,809,580 yards of earth, took 3 years to complete.

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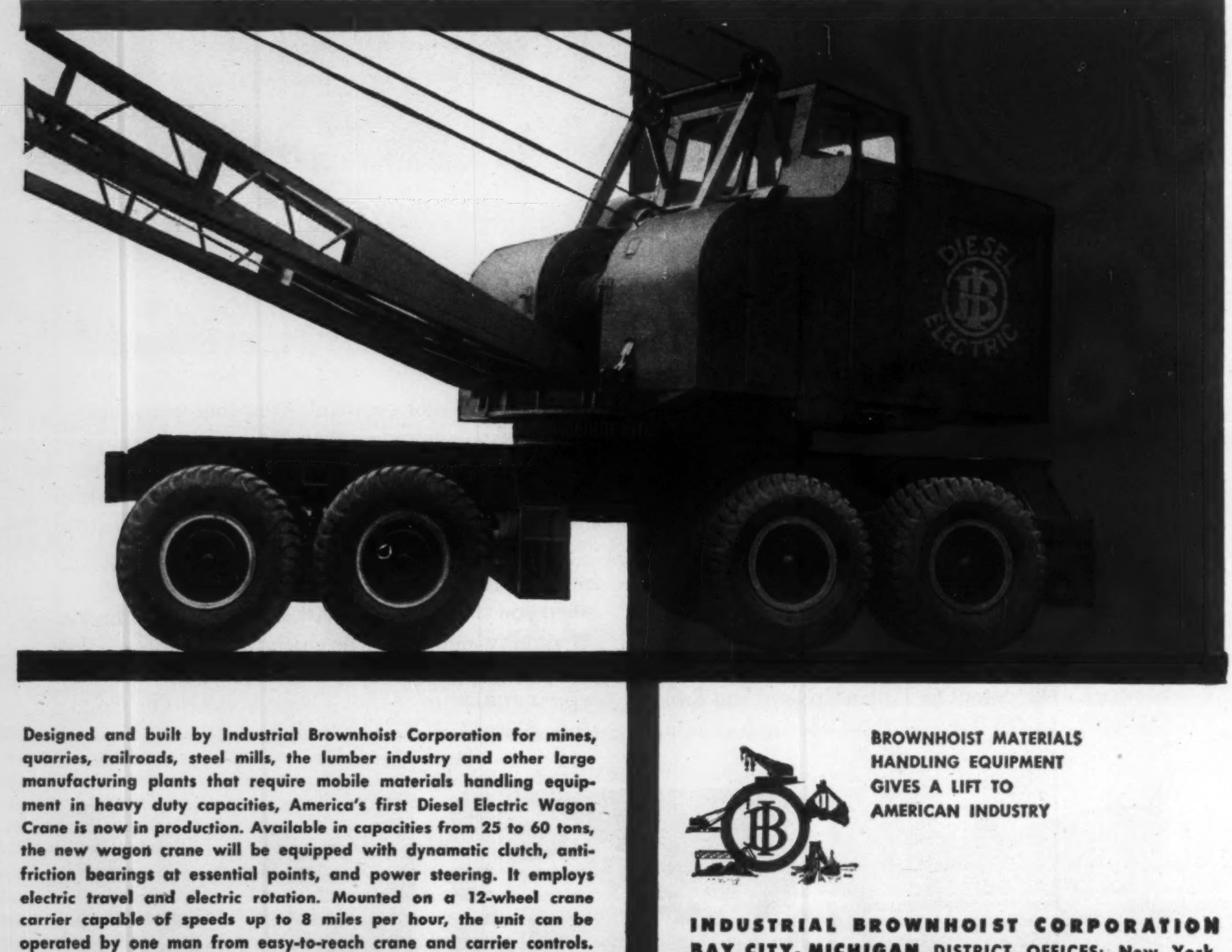

Designed and built by Industrial Brownhoist Corporation for mines, quarries, railroads, steel mills, the lumber industry and other large manufacturing plants that require mobile materials handling equipment in heavy duty capacities, America's first Diesel Electric Wagon Crane is now in production. Available in capacities from 25 to 60 tons, the new wagon crane will be equipped with dynamatic clutch, anti-friction bearings at essential points, and power steering. It employs electric travel and electric rotation. Mounted on a 12-wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach crane and carrier controls. Rigorous tests indicate that the new machine provides economical operation and insures added savings of time and labor in heavy duty materials handling work. For complete details, consult a Brownhoist representative or write us today.

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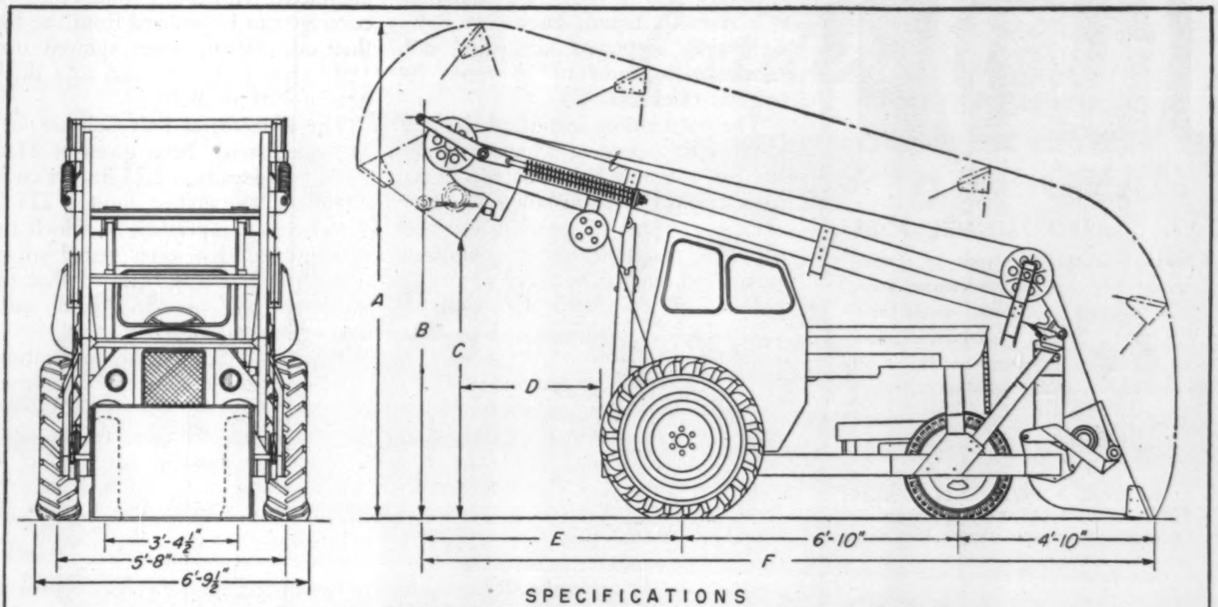


SPECIFICATIONS

¾ Yard Bucket		A	B	C	D	E	F
Minimum discharge	Ft. In.	12-1	9-10	6-11	3-5½	6-4	18-0
Maximum discharge	Ft. In.	16-1	14-1	11-2	2-0	4-2	15-10½

DISCHARGE HEIGHT is controlled with a hand-operated winch that raises and lowers the machine's overhead structure.

Loader Has Fast Cycle Time

New to most U. S. eyes is the Merton Overloader—a rubber-tired British loader that in tests has produced 8 loading and unloading cycles in 81 sec.

The bucket of the new rig has a capacity of ¾ cu yd and is operated by means of winches and cables. The winches are mounted above the rear wheels on either side of the cab and are controlled by one lever that operates both the winch drive clutch and the winch brakes. The drive to the winches is taken from the front of the 44-hp Fordson diesel and is therefore completely independent of the master clutch. Machine travel is unrestricted by the loading and unloading cycle.

The digging depth of the bucket can be adjusted to any position between 2 in. above ground level and 4 in. below. The adjustment to 2 in. above ground facilitates the operation of the machine when it is operating over uneven terrain when it is important that water or foreign matter from the base of a pile should not be mixed with the material being loaded.

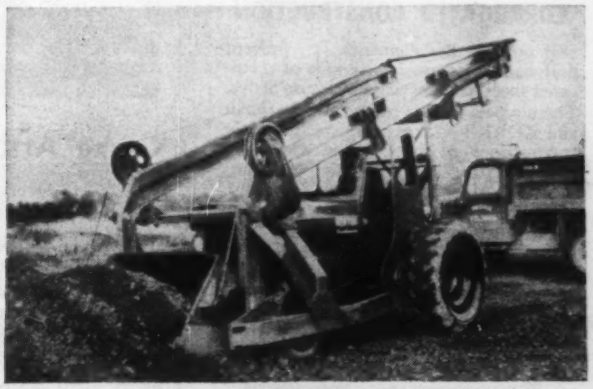
A small hand-operated winch raises and lowers the overhead structure of the machine by extending and retracting the telescopic upright members so that the bucket can be discharged at any height from a minimum of 6 ft 11 in. to a maximum of 11 ft 2 in.

The turning radius of the Overloader is 17½ ft and the reach of the bucket is 3½ ft. A light materials bucket with a capacity of 1 yd is available, and other optional equipment includes a 6-ft 9-in. dozer blade and a 1-ton crane hook attachment.

The unit has six forward speeds from 2 to 12 mph and two reverse speeds of 2.5 and 4.5 mph. Seaboard Equipment Co., 7 Hanover St., New York, N. Y.

(*New Products continued on p. 164*)

BULLDOZER BLADE increases versatility of Overloader.



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Spray-on Insulation Foams to Size

A new idea in industrial insulation is a resinous liquid, known as Poly-Cell, that is sprayed like paint, but immediately foams to 20 times its original thickness.

The outstanding feature of the material is the speed at which irregular surfaces can now be insulated. Being sprayable, it can be installed wherever a spray gun can be pointed and will adhere to practically any type of clean surface, whether it be moist or dry.

When first sprayed, Poly-Cell resembles a heavy coat of varnish. After a few minutes, however, it has swollen to a thick, airy cushion, and after 15 minutes the foaming action has ceased, leaving a normal looking semirigid insulation.

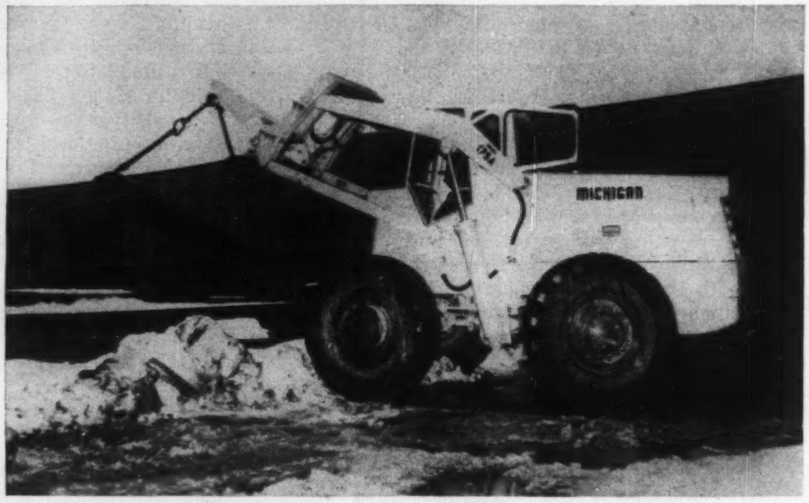
It is claimed that Poly-Cell insulation can be applied at any desired thickness in one coat. Accomplishing this is merely a matter of varying the amount of liquid originally sprayed. A little practice, it is believed, will soon enable the applicator to judge the correct amount to be sprayed for any specified thickness. Its most economical thickness is ½ to 1 in.

The number of square feet covered by one gallon of Poly-Cell will, of course, vary with the thickness to be obtained. However, some idea of coverage can be realized from the fact that one gallon, when sprayed over 100 square feet, will foam to a thickness of ⅜ of an inch.

The K factor of Poly-Cell per inch of thickness has been given as 24 at 75 F. and density is 2.25 lbs per cu ft. The high temperature limit is 225 F. The lowest temperature at which the new product has been tested so far is −40 F, but it is believed that the insulation will be effective at much lower temperatures.

Poly-Cell also meets specifications involving fire resistance. Non-combustible, it contains no volatiles and can be sprayed near flames with safety. When dry it still retains its fire resistance and will not support combustion. Flames held against the insulation tend to make it melt, but there is no spreading of the fire.

In writing the specifications for an insulation, it would be rare indeed to name a color, yet it will now be entirely possible for an engineer to do just that. Poly-Cell can be colored to almost any conceivable shade, but such a step will probably not be very common because a vapor or weather barrier is required for this material



Crane Attachment Fits Tractor Shovels

A crane attachment with a forged steel hook and double tilt cylinders is now available for all models of Michigan tractor shovels. The double tilt cylinders change the crane hook angle independent of the boom lift cylinders under maximum load conditions. Boom length of the smallest attachment is 3 ft and for the largest 4½ ft, with corresponding load capacities of 4,000 to 7,500 lbs when the vehicle is stationary. The hook on the largest model can reach a maximum height of over 15 ft or extend forward more than 9 ft. Removal of four pins permits replacement of the bucket with the crane without any of the hydraulic connections being broken in the process. Clark Equipment Co., Benton Harbor, Mich.

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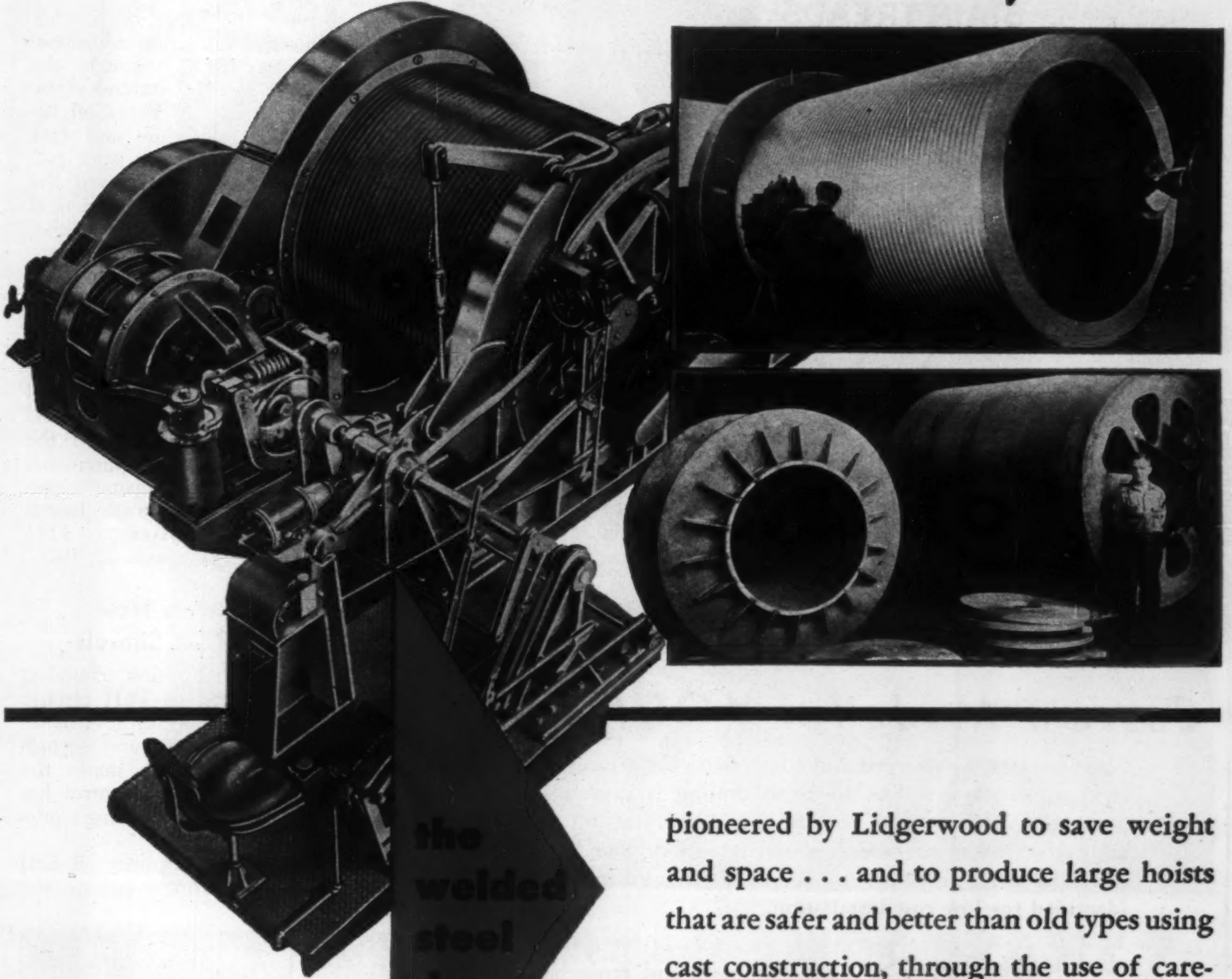

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as it is with others. Poly-Cell is normally tan and will be supplied in that shade. However, if color coding, or any other reason, should ever dictate that an inside, uncovered insulation be colored, it will be a simple matter to add dye to the Poly-Cell liquid before it is sprayed.

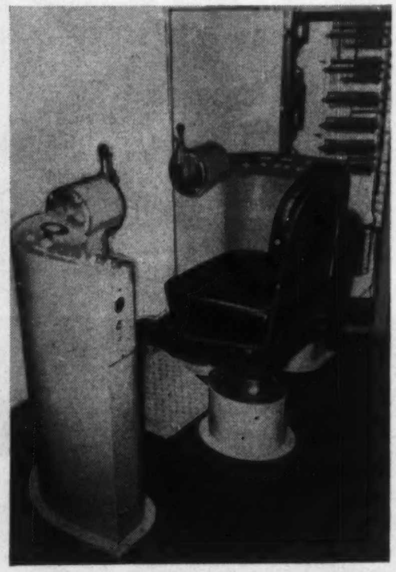
In spraying the vapor or weather barrier over this insulation additional savings are expected through the elimination of a tack coat and membrane. The makers of Poly-Cell believe that the membrane and tack coat will not be necessary since two hours after it has been sprayed the material is said to be strong and rigid enough to support a man's weight. Further, there are no joints to expand and contract; therefore, no membrane is needed to bridge the joints.

Poly-Cell, before it is sprayed, consists of two liquids which must be blended in exact proportions, heated to a certain temperature and the heat retained until the liquids reach the gun. These and other requirements are accomplished with apparatus specially developed for the work. INSUL-MASTIC CORP. OF AMERICA, 1141 OLIVER BLDG., PITTSBURGH 22, PA.

Electronic Controls Now Standard On P&H Shovels

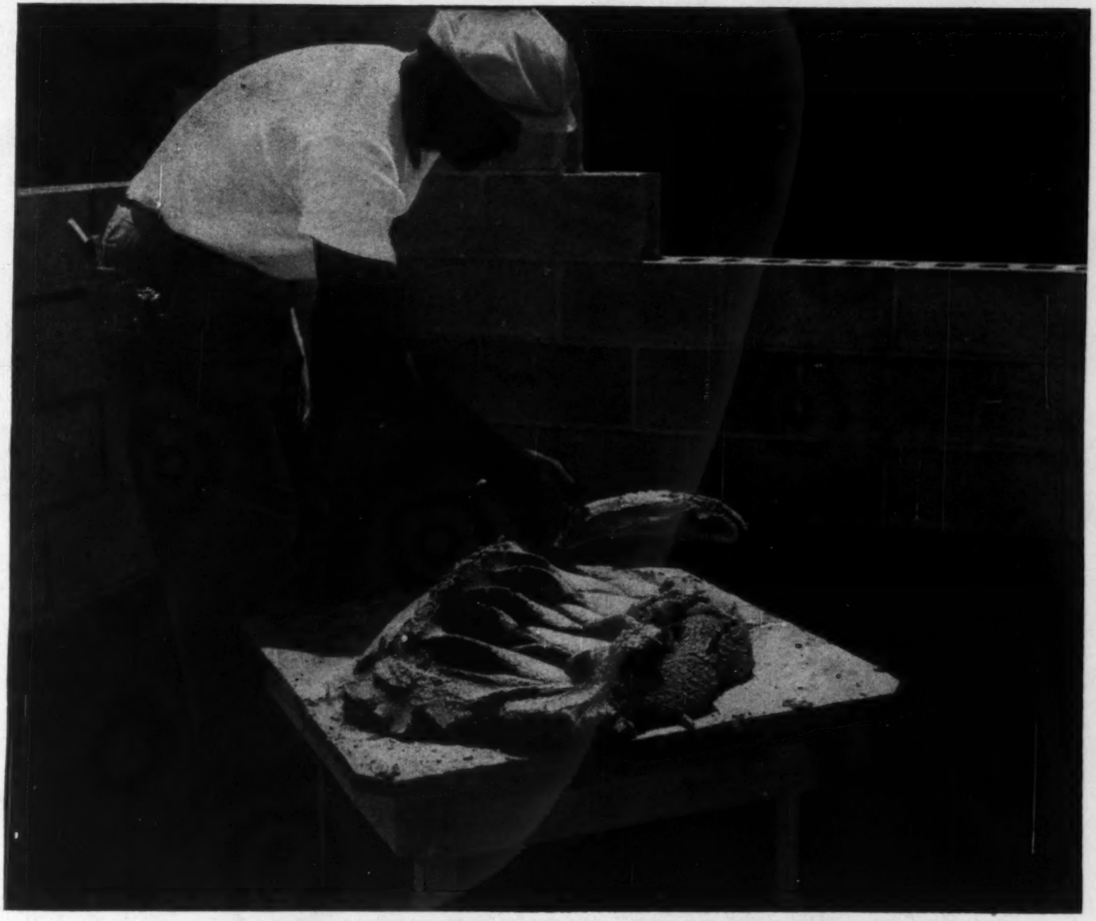
Electronic control is now offered as standard equipment on P&H electric shovels. The new control governs all shovel-operating motions, and, according to the manufacturer, marks the first time full electronic control has been applied to large excavating equipment.

Tested and proved under all field conditions, the control is said to offer



BRIXMENT

Better Mortar for Blocks



WHY IS GOOD MORTAR IMPORTANT?

BRIXMENT
CEMENT FOR MASONRY
LOUISVILLE CEMENT CO.

Because of their size and weight, concrete blocks require mortar with "body", plasticity and water-retaining capacity. Brixment meets all these requirements. It has the *body* necessary to support the weight of the unit and hold it up to the line. It has the *plasticity* necessary to prevent the mortar from falling off the long head joint, while the block is being placed in the wall. It has high *water-retaining capacity,* which gives the bricklayer more time to shift and adjust the block to its final position before the mortar stiffens.

It is the combination of these characteristics that makes Brixment the leading masonry cement for concrete block as well as for brick.

AMERICAN INDUSTRY CONTINUES TO BUILD WITH LURIA

Omar INCORPORATED has expanded with 30 LURIA Buildings since 1949

This new Omar building in Indianapolis, Ind. — the 30th Luria structure for America's fastest-growing bakers — basically is a counterpart of its twenty-nine predecessors located in Ohio, Indiana, Nebraska, Iowa, Wisconsin and Illinois. E. W. Hauser Construction Company of Indianapolis was general contractor for this newest building.

LURIA combines the DESIGN and PERMANENCE of CUSTOM-BUILT UNITS . . . with the SPEED and LOW COST of STANDARDIZATION

Can standardized buildings *look* the way you want them to? Yes—if they are Luria structural steel buildings. The *flexibility* and *adaptability of design* provided by the "Luria system of standardization" make possible almost *any* type of architectural treatment suitable to your *individual* requirements. And to assure you *durability of structure*, Luria materials and construction surpass the most stringent building code requirements. Finally, Luria Buildings deliver substantial *initial* savings, continuing *maintenance* savings. The list of companies who *re-order* Luria Buildings is best testimony of the many advantages of Luria Standardization. Contact your Luria representative. *It pays!*

LURIA ENGINEERING Company
511 FIFTH AVENUE, NEW YORK 17, N. Y.
Plant: BETHLEHEM, PA.
District Offices: ATLANTA • PHILADELPHIA • BOSTON • CHICAGO • WASHINGTON, D. C.

more rapid signal response from controllers and greater ease of operation with the stepless controller feature retained. Shovel cycle time is said to be reduced because of this.

To emphasize the extreme simplicity and reliability of this electronic control system, it is reported that the electrical circuits and components can be understood easily by any electrician.

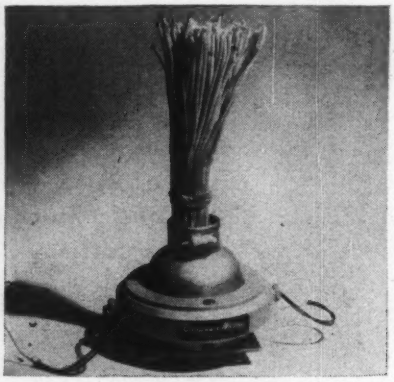
For maintenance purposes, all electronic equipment is shock mounted on removable panels for easy accessibility. P&H electronic control is offered as standard equipment on electric shovels from P&H Model 1400 (4½ yd) through the Model 1800 (8 cu yd). HARNISCHFEGER CORP., ELECTRIC SHOVEL DIV., 4620 W. NATIONAL AVE., MILWAUKEE 46, WIS.

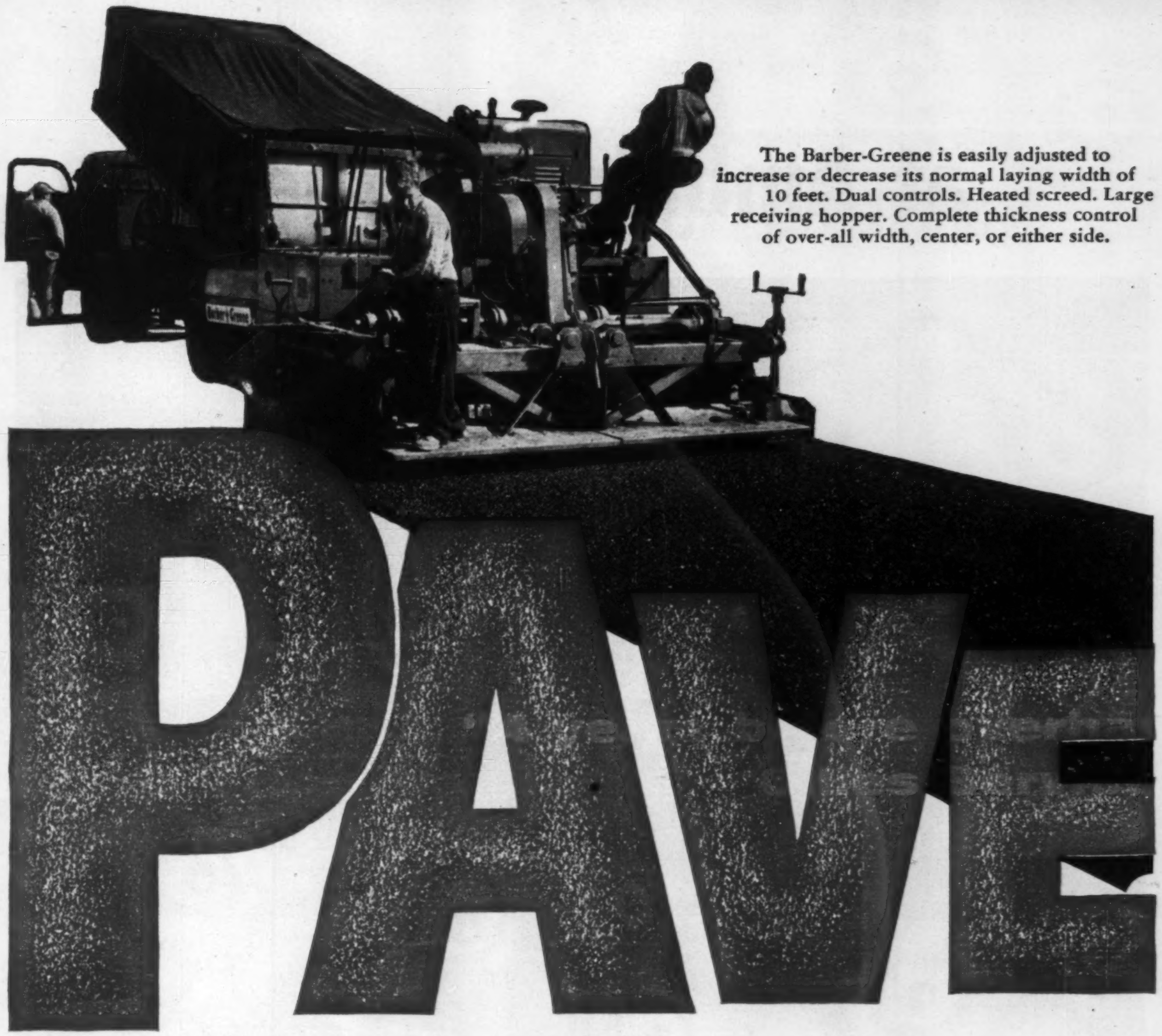
Explosive Disconnect Opens 100 Circuits Without Shorts

Integrated with the body of a standard electrical plug and receptacle, a new explosive disconnect provides for the instantaneous opening of as many as 100 circuits on a non-shorting basis. Where desired, time delay up to 3 seconds can be incorporated, and although the action is not immediately repeatable, the unit can be reconnected, re-loaded, and re-used through several cycles. Circuit configuration is limited only by the availability of standard plug and receptacle inserts.

In design, the disconnect incorporates two primers (visible at the opposite sides of the unit) fired by a simple, normally-open switching circuit. Primer leads can be as long as desired, and minimum firing-power requirement is 1 amp at 3 colts. When the unit is fired, two securing screws are severed. Their threaded ends are provided with screwdriver slots for removal before re-use. BECKMA & WHITLEY, INC., 994 E. SAN CARLOS AVE., SAN CARLOS, CALIF.

(*New Products continued on p. 162*)





The Barber-Greene is easily adjusted to increase or decrease its normal laying width of 10 feet. Dual controls. Heated screed. Large receiving hopper. Complete thickness control of over-all width, center, or either side.

PAVE profitably. **PAVE** with any mix, hot or cold.

PAVE with the tamper that compacts to uniform density.

PAVE with automatic leveling. **PAVE** with positive traction.

PAVE with permanent bond between strips.

Let us show you how the Barber-Greene Finisher can reduce your costs.

54-38F

Barber-Greene

AURORA, ILLINOIS, U.S.A.

BG

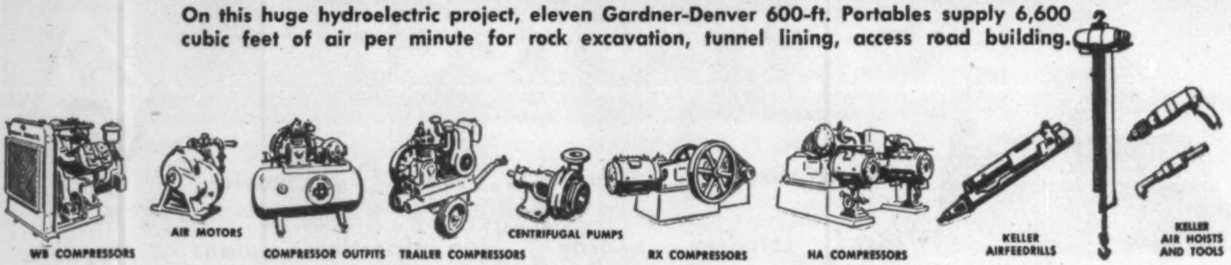
WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

at Ambuklao -- the rock

On this huge hydroelectric project, eleven Gardner-Denver 600-ft. Portables supply 6,600 cubic feet of air per minute for rock excavation, tunnel lining, access road building.


WB COMPRESSORS
AIR MOTORS
COMPRESSOR OUTFITS
TRAILER COMPRESSORS
CENTRIFUGAL PUMPS
RX COMPRESSORS
HA COMPRESSORS
KELLER AIRFEEDRILLS
KELLER AIR HOISTS AND TOOLS

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada) Ltd., 14 Curity Avenue, Toronto 16, Ontario

work goes Gardner-Denver

Contractors--

Guy F. Atkinson Company
Philippine Engineers Syndicate, Inc.

Project--

A 3-year construction schedule for Ambuklao hydroelectric project of the National Power Corp. in the Philippine Islands.

Rock Work--

One of the largest of all earth fill dams —two diversion tunnels—pressure tunnel—underground power station—open spillway—access roads.

Gardner-Denver Equipment on the Job--

11—600-ft. Portables
15—SF93 Drifters
13—JB11 Hydraulic Booms
12—URM99 Wagon Drills
10—FL48 Air Leg Drills
5—5" Centrifugal Pumps
3—10 x 3 x 10 Grout Pumps
1—WBQ Stationary Compressor
1—105-ft. Portable
1—Tank-Mounted Compressor
1—DS6 Drill Steel Sharpener
Also—Air Motors, Line Oilers and Drill Rods

SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

GARDNER-DENVER
GD
Since 1859

K
KELLER TOOLS

ROBERTSON
VENTILATORS

Write
for this free booklet
to learn more about
the science of
industrial ventilation

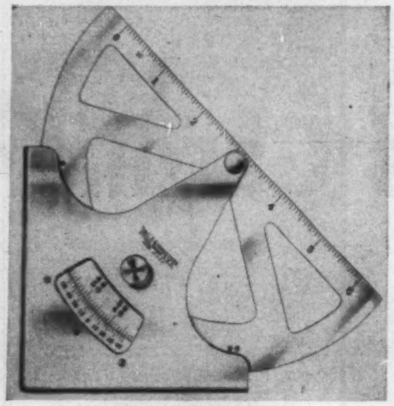
You'll find this booklet to be more than a ventilator catalog, because H. H. Robertson specializes in *ventilation engineering* . . . the exact specification of ventilating equipment for the building and its size and function, weighed against atmospheric conditions. It contains detailed tables of exhaust capacities based upon average wind velocities, temperature differences, and height above intake, and shows you how to use them. Also included are general ventilation data and average requirements for various types of buildings. Simply address a letter to us on your company stationery and the ventilation booklet will be sent to you at once without obligation.

Robertson Ventilators

developed and manufactured by

H. H. Robertson Company
2420 Farmers Bank Building
Pittsburgh 22, Pennsylvania

Offices in All Principal Cities
World-Wide Building Service



Protractor Has Built-In Vernier for 5-Min Accuracy

Stainless steel construction and convenient setting, are features reported for a new protractor with vernier scale. The No. 361 Draftsmen's Protractor lies flat on the drawing board and locks at any desired setting by means of a single knurled binding nut which also serves as a "knob" for picking up the instrument.

The protractor arc is graduated through 90 deg and figured both ways to read from right or left. A 6-in. scale on the straight edge of the arc is graduated in 16ths.

The protractor does not have to be reset to obtain the complement of any angle. A line marked off against the edge of the stock will automatically form the complement of the angle to which the protractor is set. The L. S. Starrett Co., Athol, Mass.

New Arc Welding Permits Switching From AC to DC

A new combination arc welder provides a choice of either AC or DC welding current. Called the Idealarc, the machine is said to provide an ideal type of welding arc for every type of manual welding application, permitting selection of either AC or DC and either a soft or forceful arc.

The welder is available in several combinations. It can be obtained as an AC welder without the DC current to which a DC package can be attached in about an hour whenever desired. It is also available as a combination AC and DC machine with selection of either current made through a simple twist of a switch handle. Thus it is said that the machine can be quickly set for maximum efficiency on every type of welding—ferrous or non-ferrous materials, sheet metal or heavy plate, all positions, and under arc blow conditions or poor fit up.

For AC welding jobs the machine provides a single phase transformer type welder, the circuit of which has been designed to give greater arc stability than is normally associated with welding transformers. The machine is said by the manufacturer to produce an exceptional smooth spray type of transfer of metal.

Both voltage and amperage are controlled to give the desired control of arc characteristics. The Idealarc provides continuous current control through a rotating core in a separate control circuit and also has a switch to permit control of the open circuit voltage. Through this voltage control, the arc can be made to be either a soft arc, steady, low in spatter with a spray type of metal transfer, or it can be made a forceful digging arc with maximum penetration for crowding the arc without a tendency for electrode sticking.

In addition to dual-control of the arc, the machine also has an arc booster switch for selecting normal or "hot" starting. The machine reportedly provides unusually good AC current starting characteristics, but the switch permits control to give efficient performance on different types of materials, in varying thicknesses and under different joint conditions.

The new machine, it is claimed, will permit using, to their maximum advantage in speed and quality, the new iron powder type electrodes which are designed for best performance with AC current.

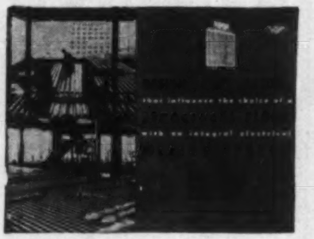
For DC welding, the welder provides welding current through heavy duty rectifiers. Dual-control of the arc is provided and, in addition, ability to select either normal or "hot" starting with the arc booster. Current models available are 300, 400 and 500 ampere AC combined with DC capacities in 200, 300, 375, and 450 amperes. The Lincoln Electric Co., Cleveland 17, Ohio.

Pre-blended Gypsum-Perlite Plaster Is Crack Resistant

A new gypsum plaster made of perlite aggregate and gypsum blended in proper proportion at the factory requires only clean water to be added on the job. It is designed to be used over metal or gypsum lath or masonry and the same material is used for both the scratch and the brown coat.

Lite-Wall, as it is called, is reportedly 50% lighter than ordinary sand plasters, more fireproof, more crack resistant and more uniform in working qualities than plasters mixed on the job. The Ruberoid Co., 500 Fifth Ave., New York 36, N. Y.

Write for these free data books from H. H. Robertson's technical library



1.
Design and Cost Factors

This book compares Q-Floor with other types. Based upon a typical multi-story building, the study is replete with charts and cost analyses of all structural components.

HOW TO FIREPROOF
ROBERTSON Q-FLOOR

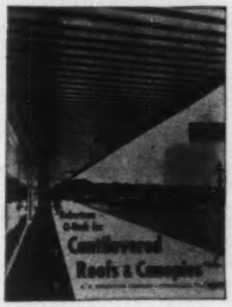
2.
How to Fireproof Q-Floor and Structural Steel

This is a description of fireproofing methods when Q-Floor is used with structural steel framing. It contains detailed drawings, typical code requirements and fire resistive ratings.

AN ANALYSIS
OF SIX POPULAR ROOF CONSTRUCTIONS

3.
An Analysis of Industrial Roof Construction

All the better-known roof types (flat, monitor, bow-string, double-pitch, high-low bay, saw tooth) are compared on the basis of weight of structural steel, volume, roofing, sash area, flashing, ventilation and daylighting.



4.
Cantilevered Roofs and Canopies

This is information on the use of long-span Q-Deck on modern buildings that call for covered walkways or overhanging roofs for weather protection. Loading conditions and structural details shown.

Concrete Fill

5.
Concrete Fill on Q-Floor

This booklet gives recommended practices for concrete fill over Q-Floor. You'll find specifications for formulation, placement and curing, plus treatises on the nature and reactions of concrete.

6.
Acoustical Data on Q-Deck

Though the fluted undersurface of Q-Deck provides some acoustical value, demand for more has led Robertson engineers to devise a new low-cost treatment. Test data and details are included.

Robertson Products

for modern buildings

H. H. Robertson Company
2420 Farmers Bank Building, Pittsburgh 22, Pa.

Plants in U.S.A., Canada, and England
Offices in Principal Cities

Please send the free data book(s) I have circled below.

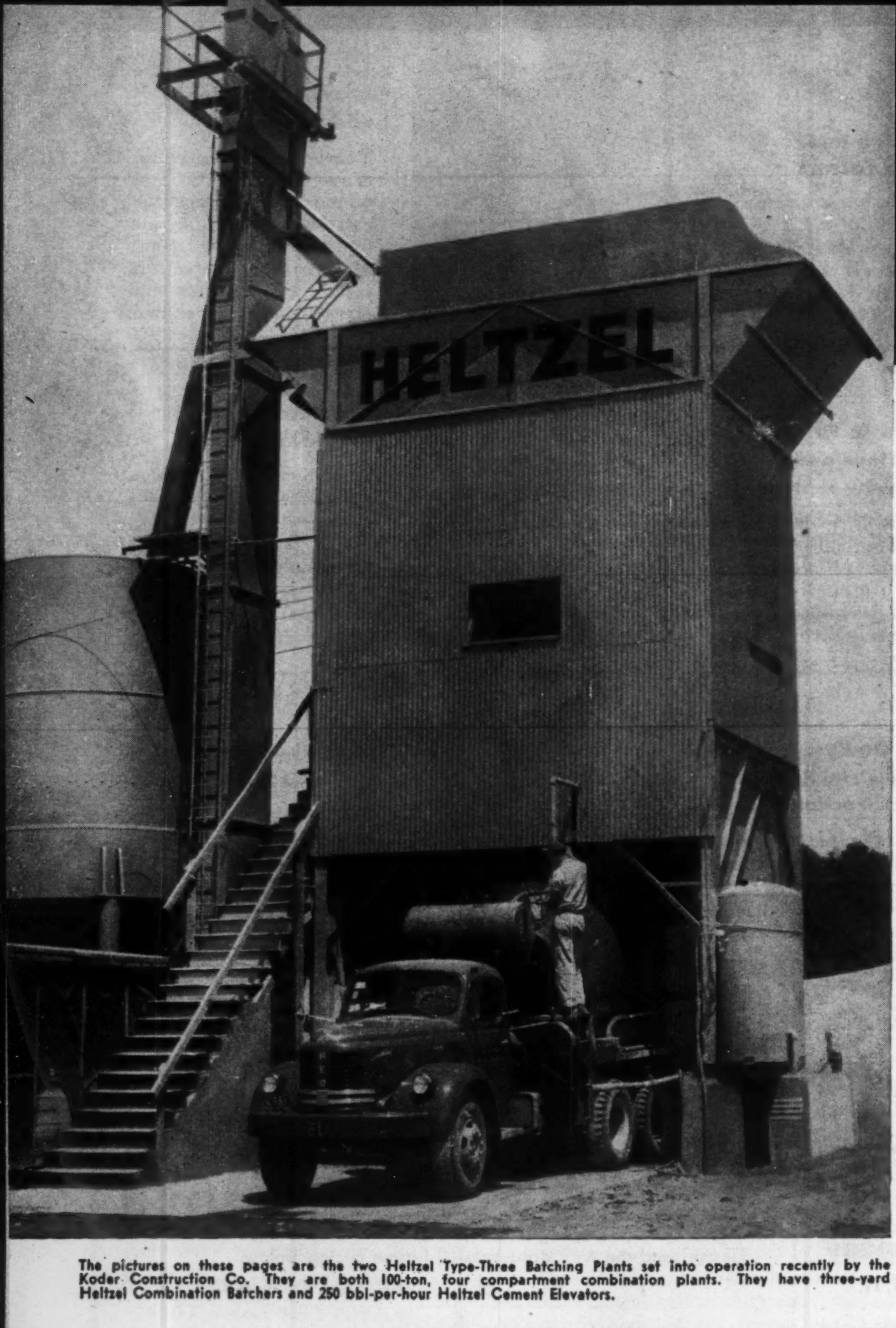
1 2 3 4 5 6

NAME ______________________

FIRM ______________________

ADDRESS ______________________

EXPANDING LAKES AREA READY-MIX with MODERN EXTRA-PORTABLE



New HELTZEL Combination Plants Take Any Size Unmatched Flexi-

The Koder Construction Co., Toledo, O., contracted to supply concrete for a large new housing development. Figuring handling costs from their yard to job site, Koder officials believed an "on-the-job" plant to be the answer. While checking with leading batch plant manufacturers, Koder was introduced to the new *Heltzel Type- Three* portable plant. Especially designed for flexibility of operation, the *Type-Three* is ingeniously unitized for extra fast erection and dismantling and trouble-free over-the-road handling.

Available as a combination cement-aggregate or as a straight aggregate the *Type-Three will take any batcher up to seven yards.* It can be compartmentized to suit job requirements.

The pictures on these pages are the two Heltzel Type-Three Batching Plants set into operation recently by the Koder Construction Co. They are both 100-ton, four compartment combination plants. They have three-yard Heltzel Combination Batchers and 250 bbl-per-hour Heltzel Cement Elevators.

HELTZEL

BATCHING PLANTS

THE HELTZEL STEEL FORM AND IRON COMPANY · Heltzel · WARREN, OHIO

ROAD JOINT MACHINE COMPANY · Flex-Plane · MECHANIZED CONSTRUCTION EQUIPMENT · WARREN, OHIO

THE HELTZEL STEEL FORM AND IRON COMPANY 11000 THOMAS ROAD · WARREN, OHIO

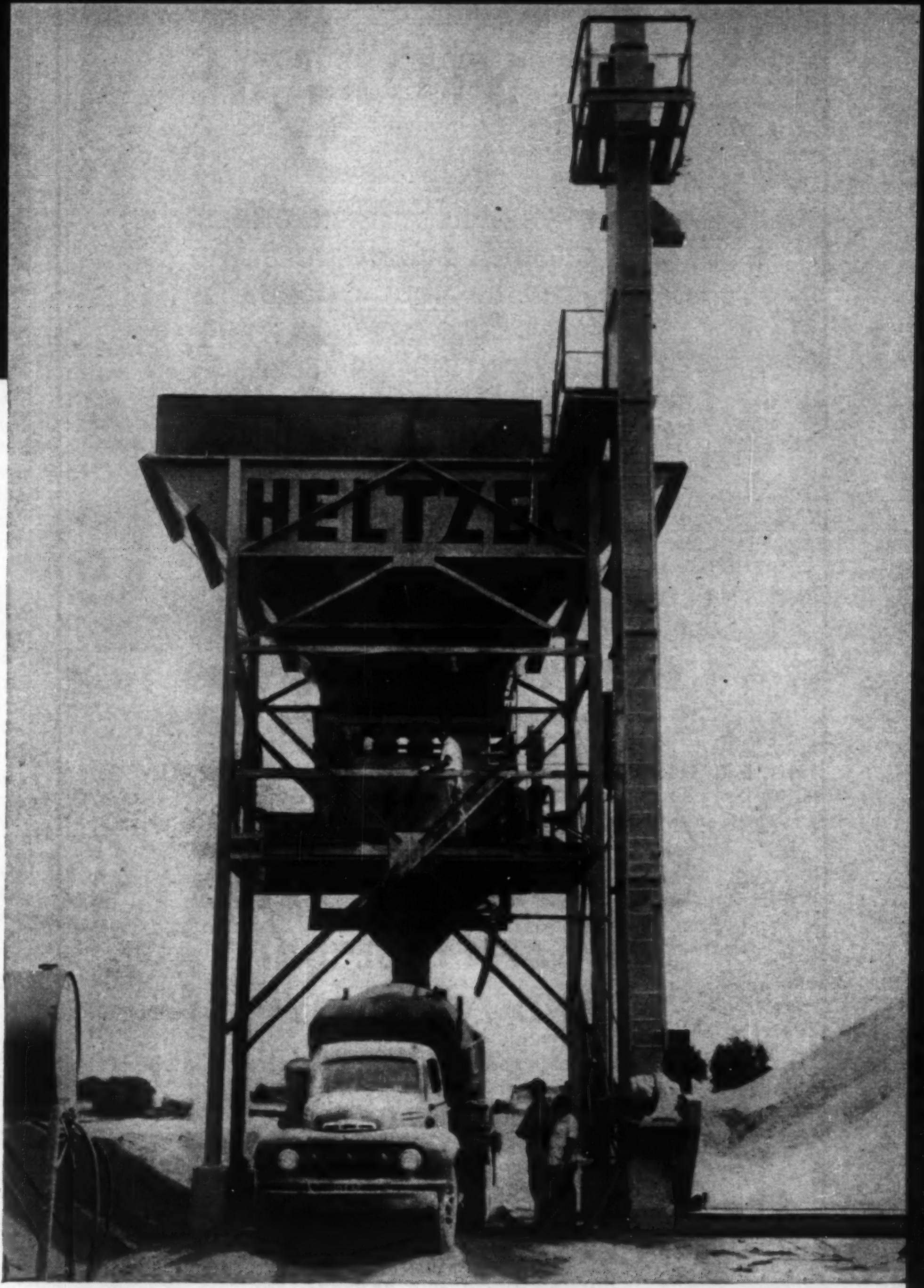
SUPPLIER SLASHES HANDLING COSTS BATCHING PLANTS RIGHT ON THE JOB

TYPE-THREE

Set up in a Hurry
Batcher . . . Permit
bility of Operation

It is equally efficient whether used as a roadbuilders, transit mix, central mix or concrete products plant. And the same plant can be quickly and inexpensively transformed from one type to another.

Koder looked them all over and then bought two *Heltzel Type-Threes* which he erected in different sections of Toledo. He found his *production with the same truck equipment boosted by 33 percent*, his handling costs have dropped correspondingly and his service is vastly improved. Long an advocate of decentralization and "on-the-job" batching as the one sure way to cut costs and improve service, Koder says: "the Heltzel Type-Three is what we've been looking for. It's the ideal plant for those who must have wide batching flexibility."



FIND OUT ALL ABOUT IT . . .

Heltzel engineers, drawing on almost 50 years' experience, believe the new Type-Three to be the most compact, the most efficient, the most flexible plant ever designed. If you use batching plants make sure you know about this great new Heltzel Type-Three. Write ← —

THE HELTZEL STEEL FORM & IRON CO., WARREN, O.

Please send Heltzel Type-Three Batching Plant information to

NAME____________________________

STREET____________________________

CITY____________________STATE________

BOMB PROOF OIL STORAGE

WE SPECIALIZE IN UNDERGROUND OIL STORAGE AND OFFER THE RESULTS OF OUR 15 YEARS OF DESIGNING, CONSTRUCTION AND CONTINUOUS RESEARCH IN THIS FIELD. WE WILL DESIGN AND CONSTRUCT IN ROCK CHAMBERS:

- CYLINDRICAL AND RECTANGULAR TANKS OF STEEL AND CONCRETE
- STEEL BELL-TYPE TANKS FOR OIL STORAGE ON WATER
- OIL STORAGE IN UNLINED ROCK CHAMBERS

SENTAB TANKS
FOR SAFETY, SECURITY
AND ECONOMY

SVENSKA ENTREPRENAD AB, SENTAB
CIVIL ENGINEERS AND CONTRACTORS
STOCKHOLM, SWEDEN

CARACAS • CAIRO • RIO DE JANEIRO • TEHRAN

PUBLICATIONS

Heavy-duty pumps—Heavy-duty pumps for handling gritty, abrasive, abusive materials are the subject of a newly-released catalog. The full line of Nagle pumps is considered and complete diagrams and specifications are included for each model and their variations. Nagle Pumps, Inc., 1293 Center Ave., Chicago Heights, Ill.

Spray curing—Automatic spray curing and its advantages are discussed in a new bulletin. Illustrations include pictures of the automatic spray machine in use spraying both white and dark compound. Light, portable spray rigs are discussed. Bulletin P-100. The Flexible Road Joint Machine Co., Warren, Ohio.

Floor tile—A 34-page booklet briefly tells the history of this resilient floor tile manufacturer and describes its many products and services. The book is illustrated with photographs of actual installations throughout the country. Tile-Tex Div., The Flintkote Co., 1232 McKinley Ave., Chicago Heights, Ill.

Vermiculite insulation—Principal applications, installation procedures and important properties of vermiculite insulation are described in a new data booklet. The publication outlines the application of vermiculite fill in home, non-residential and farm building construction, as concrete block insulation, in cold storage, and as a sound deadener. Installation in attics, flat roofs and side walls is described and typical U values of wall and ceiling designs are listed. Form HI-48. Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill.

Bodies and hoists—A 4-page catalog describes Galion Allsteel Model 12N-5 bodies and Model 800T, 880 and 77353 hydraulic hoists. Illustrations in the folder include cutaway views, line drawings and photos. Complete specifications are shown. The Galion Allsteel Body Co., Galion, Ohio.

Acoustical products—An illustrated design data reference volume contains full data on Fiberglas sound control products. The publication is organized to provide for architects, engineers, builders and installers complete data reference on the products and installation systems. A selection guide covers all products with condensed description and data on usage, installation, standard sizes, relative costs and noise reduction, fire resistance and light reflection qualities. Each product and installation system then is treated in greater detail in individual sections. In addition, the publication contains material on specifications and sound control concepts. Design Data AC6.A1. Owens-Corning Fiberglas Corp., Toledo 1, Ohio.

Truck crane—A new bulletin has been prepared on the P&H Model 105 TC truck crane. Offered as a big brother to the Miti-Mite, the Model 105 TC is available only on its own precision-built carrier. It is rated at 10 tons capacity. Complete details are included along with on-the-job illustrations. Bulletin TX-159. Harnischfeger Corp., 4610 W. National Ave., Milwaukee 46, Wis.

Air-actuated clutch—Bulletin No. 304 describes performance characteristics of the Model PO air-actuated clutch for installation on equipment such as cranes and shovels. The clutches are available in sizes 14 in. through 36 in. with torque capacities to 120,000 lb-ft. They can be used both as a replacement on old installations or designed into new equipment. Twin Disc Clutch Co., Racine, Wis.

General catalog and parts list—A new catalog consists of a description of various parts employed for erection of Advance tubular steel scaffold and materials hoisting towers. The booklet is illustrated with numerous line drawings and photographs showing typical installations. Advance Scaffold Div., Beaver Art Metal Corp., Dept. 41-19, Ellwood City, Pa.

1½-yd crane-shovel—A new 16-page illustrated catalog describes the design and construction features of the recently announced Bay City 1½-yd crane shovel. The catalog contains many machinery and parts pictures to graphically portray these features on the convertible excavator. Catalog 70/700-A. Bay City Shovels, Inc., Bay City, Mich.

Timber connectors—Where and how to install five types of timber connectors, used to increase the strength of joints in a variety of light and heavy timber structures, are described in the new edition of a 12-page booklet, "Installing TECO Timber Connectors." Timber Engineering Co., 1319-18th St., N.W., Washington 6, D. C.

Get Into Tight Spots at a Profit
...With a Sherman Power Digger!

Here's real proof of the compactness and maneuverability of the Sherman Power Digger! The job: Dig a 6 foot deep machine foundation hole 10 feet square in a working area only 20 feet square, with overhead beams and lights reducing the ceiling limit to less than 10 feet in some spots.

The floor was 8 to 10 inches of concrete, reinforced with ¼ inch steel rod. It was broken up with air tools, then loaded into a dump truck by the digger. Manual loading would have been difficult because of the reinforcing rods, but these presented no problem when loaded mechanically.

Digging and loading took less than four hours, in spite of the limited maneuvering area. Estimated time for hand labor: Three men working about 2½ days!

If you now excavate by hand, or if your heavier power equipment cannot work in tight spots, you'll profit with a Sherman Power Digger. It's compact, flexible, fast, easy to operate. It costs little to buy, less to maintain, quickly pays for itself. For the whole story, write today for Bulletin No 54-C.

Designed, Engineered and Manufactured Jointly by
SHERMAN PRODUCTS, Inc.
Royal Oak, Michigan
WAIN-ROY CORPORATION
Hubbardston, Mass.
•
Patent No. 2,303,852
Other patents pending
© SHERMAN PRODUCTS INC., 1954

Sherman
PRODUCTS, INC.
ROYAL OAK, MICHIGAN
Sherman SP Products ®

HOW TO HANDLE
WET JOBS

ATOMIC SUBMARINE
LABORATORY

West Milton, N. Y.

Excavation: Elmhurst Contracting Co.

QUAKY SOIL—fine alluvial silt overlying bedrock — was a hazard confronting General Electric and A.E.C. Vibration of excavating machinery made soil fluid, caused collapse of test hole.

A VACUUM WELLPOINT system, by Griffin, solved the rare type of problem involved. Removal of small amounts of water (only 20 gpm)—this plus high vacuum was enough to make soil stable—even to stand at slopes as steep as 1½ on 1 (See photo).

THE SKILLS of the wellpoint engineers were taxed in many ways. A vacuum system is itself complex. The sand filters required special techniques. Though part of subgrade lay 25 ft below ground water, a multi-stage system was avoided —by working with header line *below* natural water table.

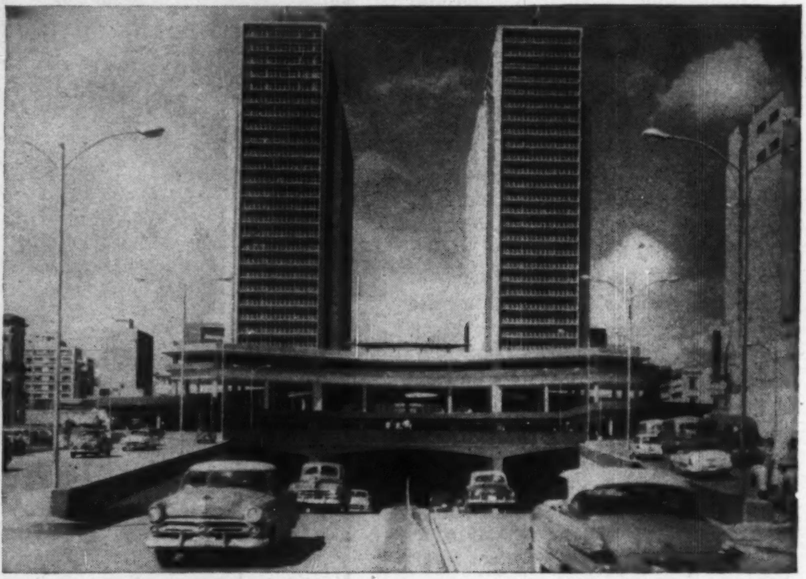
GRIFFIN
WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.

In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

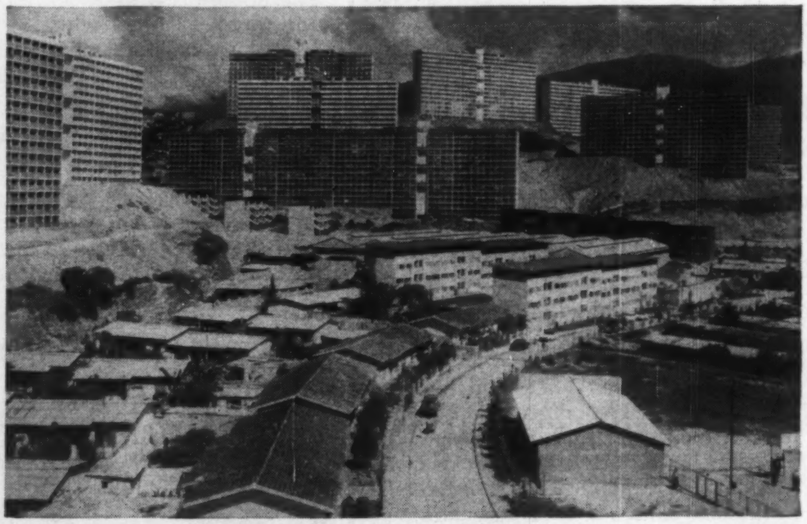
INTERNATIONAL

Biggest Year for Venezuela

Venezuela's grim determination to become a modern nation in a minimum of time paid off in a spectacular manner in 1954. As a result of two years of concentrating the bulk of its income in new construction (ENR June 21, 1954, p. 30) this small but oil-rich nation was able to place a half-billion dollars worth of projects in service before the year was over. It was the biggest year of accomplishment yet, and the projects represented every type of facility conducive to a raised standard of living—housing, school, water supply, highways, office buildings, airports, hospitals, river and canal improvement, agricultural drainage, produce markets and parks. Two of the big projects in the capital city of Caracas are pictured here.



PIERCED by a boulevard underpass, the two 30-story office buildings of the "Rockefeller Center type" development known as Avenida Bolivar were placed in service in 1954. Adjoined by two 9-story buildings, the skyscrapers are surrounded by gardened terraces and underlaid with shops, a parking garage and a bus station.



TENANTS began moving into the forty-building Cerro Piloto low-cost housing development late in 1954. Planned for 35,000 residents of Caracas, who will pay from $6 to $30 per month on a rental-purchase plan, the 15-story buildings replace one of the city's worst slums.

Tunnel Plans

Traffic tube proposals for two Canadian cities

Proposals have recently been announced in Canada for two major vehicular tunnels: one in Montreal under the St. Lawrence River, and one in Vancouver for an express highway tunnel under the Fraser River.

In Montreal, John E. Pitt, vice president of Ernest Pitt and Co., Montreal real estate brokers, notified Federal Transport Minister Marler on behalf of a group of American and European financiers that they were prepared to spend $20 million on a tunnel under the St. Lawrence River, from Montreal to the mainland on the South Shore, in return for operating rights on the tunnel. Mr. Pitt said that $10,000 had been deposited as an indication of good faith in the proposal.

The tunnel would be designed for automobile traffic in the first instance but train traffic would not be precluded. The route would probably be close to the line of the Victoria Bridge. This famous structure now carries the main line of Canadian National Railways, and a two lane highway, and is the main link between Montreal and the south. It is a low level structure and so it interferes with the proposed St. Lawrence Seaway. No plans have yet been announced as to how the bridge is to be passed by the Seaway, although active planning work is in hand. The new tunnel proposal undoubtedly has this change in the river situation in view, although Mr. Pitt's statement made no direct reference to the Seaway.

Meantime, in Vancouver plans were announced by provincial Public Works Minister P. A. Gaglardi for the study of a 6,000 foot tunnel under the Fraser River. The tunnel would be part of a $30 million "super-highway" between the city of Vancouver and the adjacent U. S. border, now under active consideration. As an alternative to the tunnel, a high-level bridge in the Ladner area is being considered. Several bridges already exist over the Fraser River but they are not considered adequate for the projected super-highway.

Congress on Structure Tests

A symposium on the observation of structures will take place at the Laboratorio Nacional de Engenharia Civil,

Wheaton, Maryland Shopping Center

Architect: John Hans Graham and Assoc., Washington, D. C. General Contractor: George C. Martin Co.

9-value Tectum® roofs in million dollar value center

A noncombustible two-inch Tectum roof deck, the exposed underside painted to specifications, shelters shoppers as they purchase high value at low cost in this million dollar co-op shopping center.

Customers will enjoy year round shopping comfort at less cost because of Tectum's high insulating properties. At least 70% of all harsh noises will be absorbed.

For years ahead, the rest of Tectum's nine values will contribute to safety, strength, and minimum upkeep. With an ultimate live load of 200 lbs. p.s.f., and greater stability than most building materials, Tectum weighs approximately 2 lbs. per board foot, is easily workable with hand tools, has a self-decorative texture, and is termite and fungus proof.

Ⓢ ***See It Now!* *Ask for 1955 Technical Data, or refer to Section 2e/Te, Sweet's Architectural File.***

Tectum® Div.

The Alliance Manufacturing Company

NEWARK, OHIO

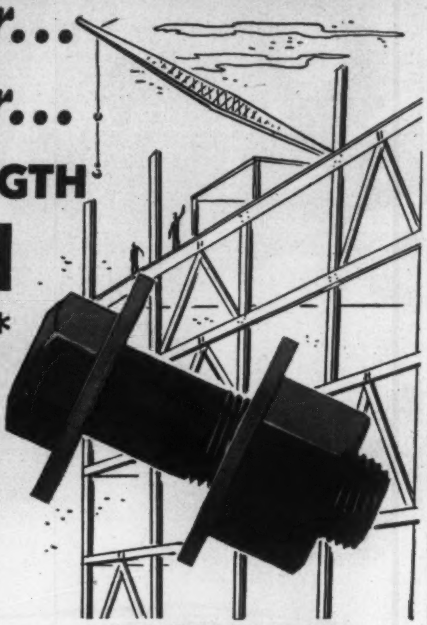
TECTUM DIV.
130 South Sixth Street, Newark, Ohio

_____ Please send Technical Data

Name _______________ Title _____

Address _______________

City _______________ Zone ____ State _______



For STRUCTURAL STEEL FRAMING

Build Faster...
Build Better...
with HIGH STRENGTH
BOLTS and
MIL-CARB*
Carburized
WASHERS

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NO BOLT IS ANY BETTER THAN ITS WASHERS

According to leading authorities in modern Structural Steel Framing Practice, high tensile steel bolting of joints instead of riveting, offers erecting contractors and owners of such structures a number of definite advantages:

- A bolted building or bridge can be completed sooner than a riveted structure.
- Hardened steel bolts, with hardened washers, can be torqued up to produce a greater clamping force than cooling of rivets can produce.
- High strength bolts of the same diameter may be substituted for rivets without reduction in size of holes.
- Your labor problem is simplified because of complete independence of field riveters.
- Bolted Construction is QUIET — especially desirable for building new wings to hospitals or for construction in "quiet zones".
- High Strength Bolts have higher strength than comparable rivets.
- High Strength Bolted Joints provide 25% higher fatigue resistance than comparable rivet joints.
- Bolted Construction is economical due to lower cost of structural jointing.

Build *better* and *faster* with High Strength Bolting of structural steel joints ... but remember that NO BOLT IS ANY BETTER THAN ITS WASHERS.

MIL-CARB Carburized Washers are fabricated from Prime Carburizing Quality Special Soundness Steel, insuring uniform quality control, always equal to the rigid specifications (ASTM Designations: A325, applying to nuts, bolts and washers).

MIL-CARB Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality.

For uniformly sound construction, specify MIL-CARB Carburized Washers.

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WROUGHT WASHER
MANUFACTURING CO.
The World's Largest Producer of Washers
2224 S. BAY ST., MILWAUKEE 7, WIS.

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Lisbon, Portugal, in October 1955, sponsored by the R.I.L.E.M. (Reunion Internationale des Laboratoires d'Essais et de Recherches sur les Materiaux et les Constructions).

The following points will be discussed: instruments for different measurements, and techniques of installation and reading; determination of properties of materials; and loads acting on structures.

Those interested should request particulars from the Secretary of the Symposium, Laboratorio Nacional de Engenharia Civil, Av. do Brasil, Lisbon, Portugal.

British Chart Thames Mud With Radioactive Tracers

As a prelude to channel clearing, British scientists are dropping small quantities of irradiated tracer chemicals into the Thames River in an attempt to discover how mud is distributed.

First tests were carried out off Gravesend, nearly midway between the mouth of the Thames Estuary and the Pool of London. There, fast-ebbing tides cut twisting channels through the silt. If it can be found exactly how and where the mud is distributed, the Thames will be dredged and blocked at strategic spots so that more shipping can put into the dock area without piloting problems.

Scientists of the Government Hydraulic Station, working with Harwell atomic physicists, picked an irradiated form of scandium as the tracer material. The scandium was ground to particles of .07 millimeter diameter to match with the average consistency of local mud. The tracer material was then dropped into the river on a flowing tide.

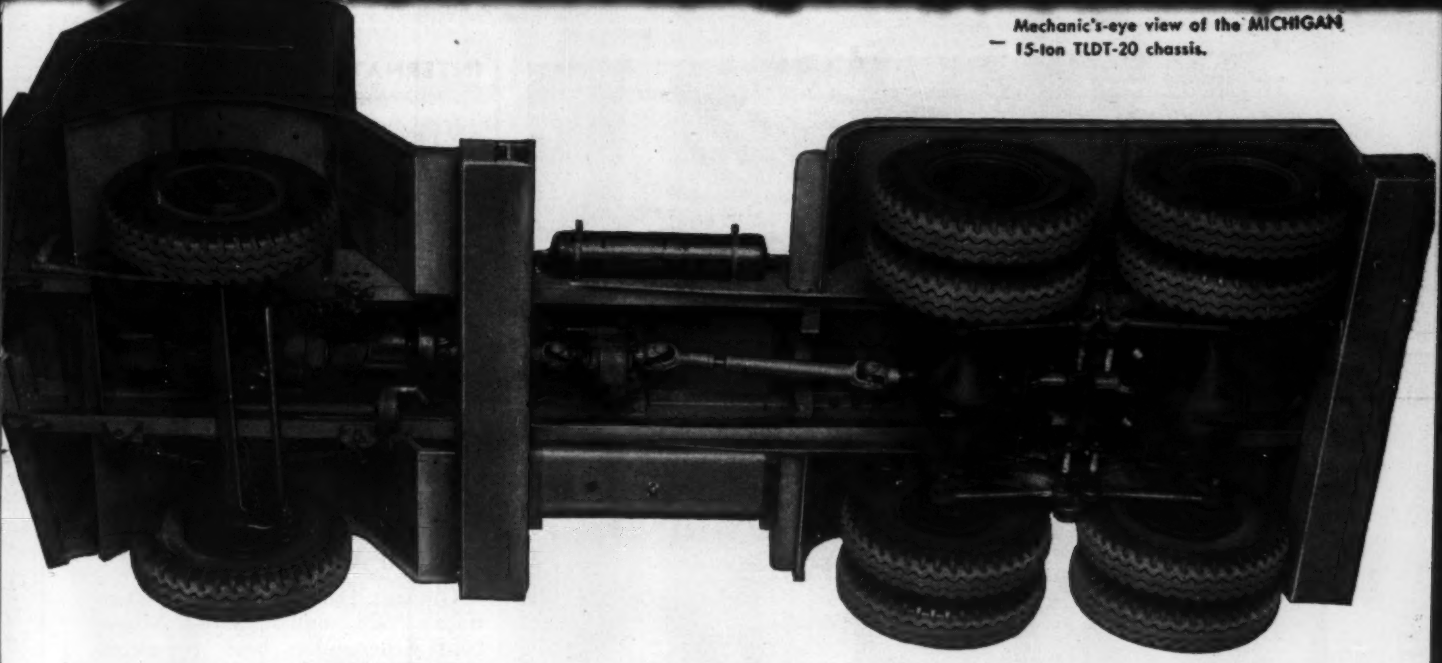
For several days afterward, scientists, carrying Geiger counters, rowed among upstream mud-flats and listened to telltale clicks from the radioactive material. Tracers were found one, two and three miles above Gravesend–and one sample was hauled out 13 miles above the dumping site.

In the spring, similar tests will be carried out on piles of sand and gravel in harbors and around the Channel seaside resorts.

Roads Being Built in Tibet, Nepal and Sikkim

The Tibetian capital of Lhasa is expected to be linked with the Chinese mainland by a motor-road early this year.

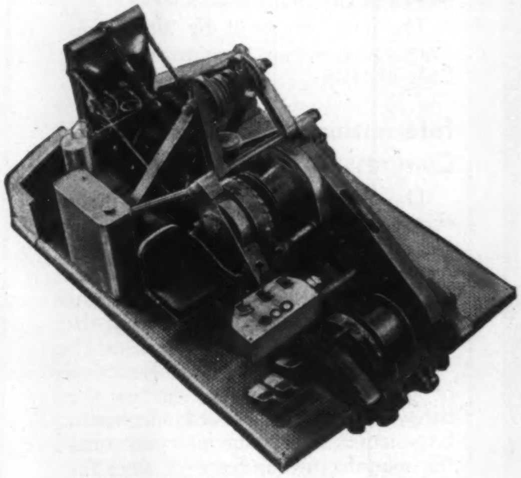
According to trading caravans arriving in Kalimpong, West Bengal, Mechanic's-eye view of the MICHIGAN 15-ton TLDT-20 chassis.



NEWS! ... **More Quality Features**

are Standard Equipment on **MICHIGAN**

½ yard models than on any comparable machine



The basic ½-yard turntable mechanism—maximum service accessibility.

In your point-for-point comparison (a smart buying tactic!) take special note of these great value features—"extras" on many other makes, standard on MICHIGAN ½ yard Truck Excavator-Cranes.

16-Ton Axles — tremendous strength! No wonder your MICHIGAN stands years of punishment.

404 Cubic-inch Truck Engine—huge power! Compare it to other ½-yard machines.

Cast Steel Turntable—machinery deck with boom hinge-pin bracket and hook roller brackets in a single rugged steel casting.

6 Hook Rollers—on most others you get only 3 or 4. MICHIGAN rollers are ball-bearing mounted for friction-free swings and tapered for easy adjustment.

Air Powered Clutches—famous for smooth, positive action; faster swing; minimum fatigue; and easy, quick service.

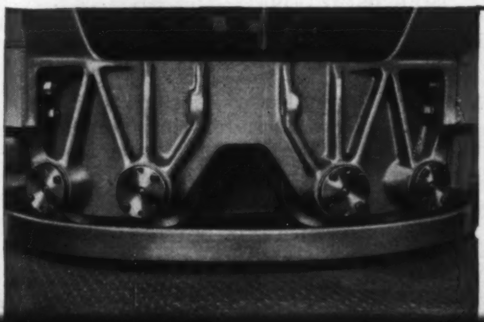
Ball Bearings—on all shafts and drums.

Power Up and Power Down — on the front drum for precision crane work.

Add these up and get this sure-thing, profitable answer: You Move More With A MICHIGAN. For more information, contact your local MICHIGAN distributor. Or send us the coupon.

MICHIGAN Tractor Shovels are available under the Clark Leasing Plan—we'll be glad to send you details.

Front-view of four of the MICHIGAN's six adjustable hook rollers.



CLARK EQUIPMENT

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Construction Machinery Division
390 Second St., Benton Harbor, Michigan

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☐ Please send MICHIGAN ½-yard Bulletin ☐ Send Lease Plan data sheet

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Firm________________

Address________________

City________________ County________________ State________________

Constant Torque Capacity

for entire life of friction material

Lipe CONSTANT-CAPACITY CLUTCH
OF THE NON-ADJUSTABLE TYPE

The Lipe Constant-Capacity Clutch uses a unique application of the toggle-lever principle: Compensates for fading pressure of expanding springs . . . maintains maximum torque capacity throughout life of frictional material.

The constantly increasing ratio of the toggle levers — which never go over center — compensate for the loss of pressure due to spring expansion. So long as there is enough frictional material to hold, the Lipe Constant-Capacity Clutch of the non-adjustable type does not lose torque capacity.

Every Feature of This Clutch Gives You Extra Service
Engages gently because the toggles absorb the initial energy of the springs . . . and because the speed of the toggle action fades as the pressure plate approaches the friction element. It has a high thermal efficiency because the massive plate, ribbed for rapid radiation, is cooled by positively generated air currents.

The pressure plate and friction element are always parallel. Non-adjustable, serviced without special tools.

Write for detailed specifications and performance data.

LIPE ROLLWAY *Lipe*-ROLLWAY CORPORATION
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

the 1409-mile highway from Sinkiang is almost complete, only the bridge over the river Rsangpo (Brahamaputra) remains to be finished.

Over ten thousand men of the Chinese communist army are reported to be working on this section.

India has also recently completed two new strategic roads with Khatmandu, capital of Nepal and a continuous motor-link from the Bengal plains up to the 14,000-foot Nathy-La pass at the Tibetan border, via the mountain protectorate of Sikkim.

First Snowy Mountains Dam Finished Ahead of Schedule

Guthega Dam—first stage of Australia's $928.2-million Snowy Mountains Scheme—has been completed ahead of schedule and officially turned over to the Snowy Mountains Hydro-Electric Authority.

The Guthega project is one of the smallest parts of the scheme (ENR Jan. 7, 1954, p. 46). Besides the $18.9-million dam at the junction of the Guthega and Snowy Rivers, it involves a 3-mi, 14-ft dia tunnel to the 60,000 kw power station at Munyang.

Before starting to generate power, the Authority will put the project through a series of special tests expected to last about four months.

The dam was built by Norwegian contractors, Selmer Engineering Pty., Ltd., of Oslo.

International Prestressing Congress to Meet in the Fall

The second Congress of the Federation Internationale de la Precontrainte (F.I.P.) will be held in Amsterdam, Netherlands, from Monday August 29th until Friday September 2nd in the Royal Tropical Institute, Mauritskade 63, Amsterdam O.

Leading subjects will be: Function of grouting and anchorages in the behaviour of prestressed elements; Experiences and problems concerning the manufacture and use of steel for prestressing; Progress of precast prestressed work in the factory and of the assembling, by prestressing on the site, of precast units; Moment distribution in statically indeterminate prestressed structures, beyond the elastic phase; Influence of platsicity on the strength and instability of prestressed thin shells; Comparative analysis of specifications and codes of practice on prestressed concrete, used in various countries; The economical advantages of prestressed concrete in various countries.

All technical papers have to be in

the hands of the secretaries of the national organizations before February 1st 1955. These papers, typewritten in one of the three congress-languages (english, french and german) and not exceeding 2500 words, should be accompanied by a summary of 100-150 words in the three languages. 50 copies of each paper should be sent if possible. Secretary of F.I.P. is Ir. J. A. H. Hartmann, Groningsestratt 15, The Hague, Tel. 01700-551173.

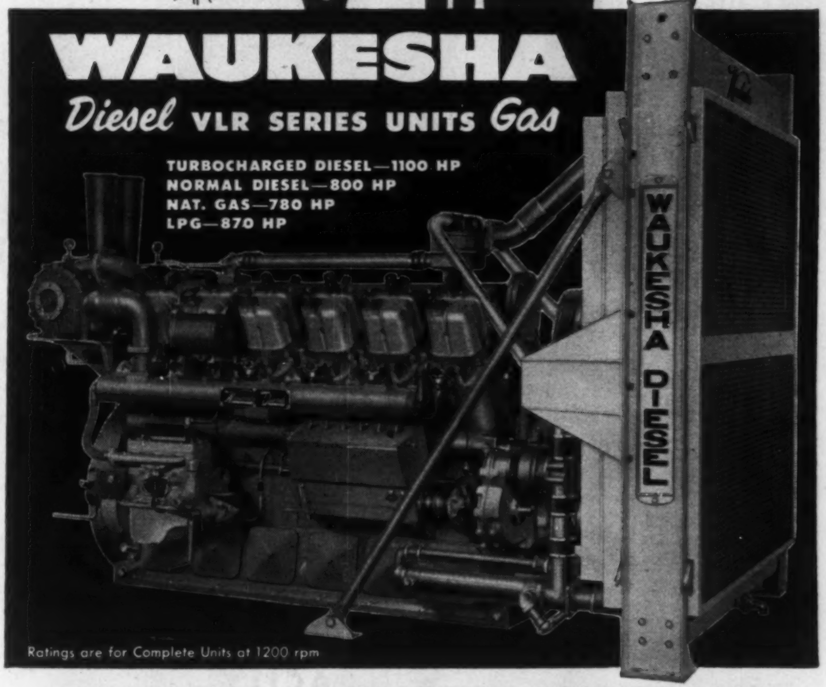
Tower 2100 Ft. High Proposed For Brussels 1958 Exposition

When the Brussels World Exposition opens in 1958, it has been proposed that the layout be dominated by a concrete tower of 1,650 feet surmounted by a radio mast 450 feet high. The proposal for the structure which would be more than double the height of the Eiffel Tower erected for the 1889 Paris Exposition, and about 650 feet higher than the Empire State building, has been made by Prof. Francois Magnel of the Community of Ghent.

Prof. Magnel, whose prestressed concrete design were used in Philadelphia's Walnut Lane Bridge, plans to use for the main structure 24-ft concrete slabs with a section approximately 20 inches by 12 inches. The tower will be a tapering cone, standing on a base of about 300 feet, and the surrounding and inner cone of 80 foot tapering to 35 foot diameter is to house the lifts and electric cables. There will be about three quarters of a million square feet of floor space on thirty floors, including a hundred administration offices contained in a concrete girdle surrounding the outer perimeter of the tower at first floor level. There will be two floors containing restaurants, bars and look-out points for visitors, and the rest will be given over to conference halls, film, radio and TV studios, a telecommunication school and various technical departments.

The first estimate of the cost is about $10,000,000, and it is hoped to recover about a third of this by charging four million visitors 80 cents apiece for visits to the summit during exhibition year.

The project is raising a good deal of criticism in Belgium, partly because of the cost and partly because some TV experts argue that extreme height is not necessary for optimum TV reception. Nevertheless, communications experts are supporting the project as it will insure a much wider range for Belgian TV programs.



new V-12

WAUKESHA

Diesel VLR SERIES UNITS Gas

TURBOCHARGED DIESEL—1100 HP
NORMAL DIESEL—800 HP
NAT. GAS—780 HP
LPG—870 HP

Ratings are for Complete Units at 1200 rpm

POWERFUL • RELIABLE • ECONOMICAL

This powerful turbo-supercharged Waukesha is a twelve-cylinder, 60-degree vee, even firing, four-cycle, solid injection, overhead valve, compression ignition Diesel, of 8½-inch bore and stroke and 5788 cubic inch displacement. The connecting rod arrangement is of the side-by-side type; opposing pistons operating from a single wide-area crankpin.

The turbocharged Diesel unit shown above develops approximately 1100 hp at 1200 rpm with radiator, fan, and air cleaners. Without turbocharging, the normal Diesel complete unit maximum rating is 800 hp. The propane-butane model of this V-12 series develops 870 hp. Bare engine ratings of all models are higher. Response to throttle and load requirements is quick and smooth, with a fast surge of reserve power for emergency and overload demands.

Tremendously powerful, remarkably rugged, this V-12 engine is designed for simplicity and reliability. Major parts are interchangeable between right and left cylinder banks. Main and rod bearings are easily accessible. Strength, precision and balance are built into all elements of the power train, from pistons to flywheel. Supporting members are designed for extreme rigidity and perfect alignment of moving parts.

Send for illustrated Bulletins 1663 (turbocharged)—1664 (normal Diesel)—1656 (gas).

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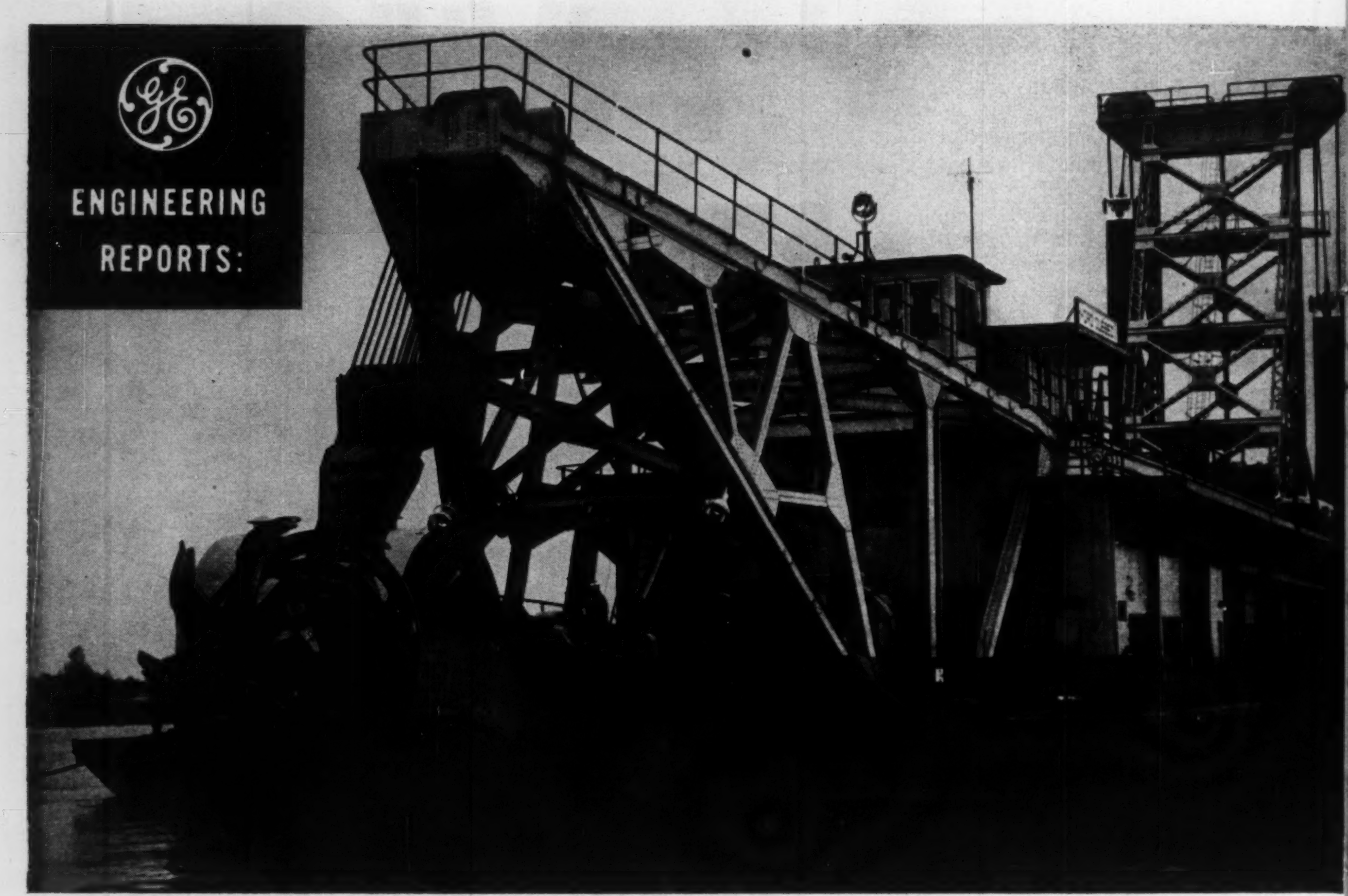
WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
New York • Tulsa • Los Angeles

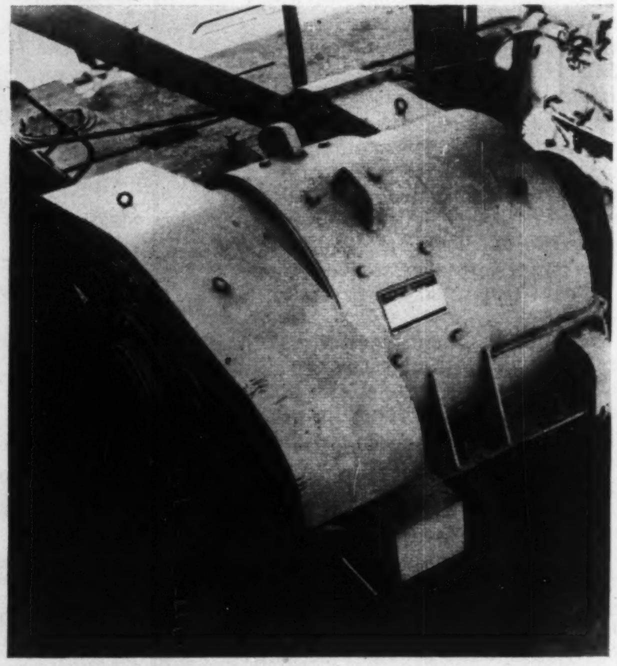
ENGINEERING REPORTS:



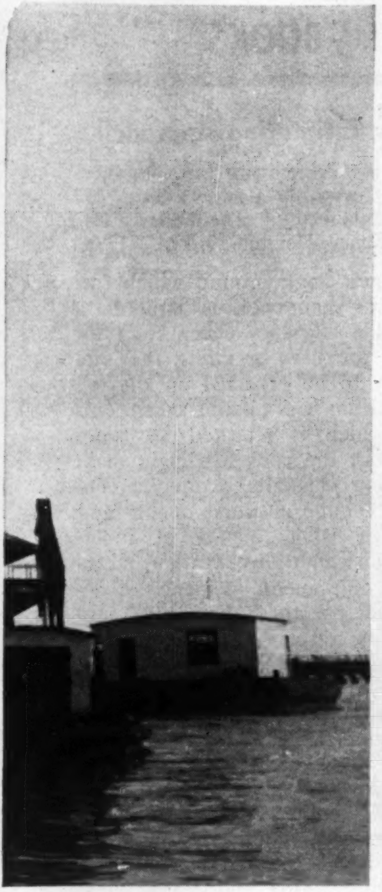
MOVING 1500-POUND BOULDERS with ease, the "Hydro-Québec" will deepen the 3300-foot-wide, 15-mile-long canal to 35 feet.

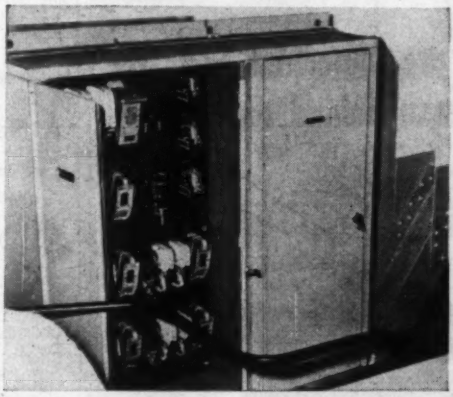
G.E.-powered dredge speeds Beauharnois

STURDY, HEAVY-DUTY induction motor powers pump that sucks up 28-in boulders. Motor was specially designed to absorb severe vibrations, load irregularities and overloads.

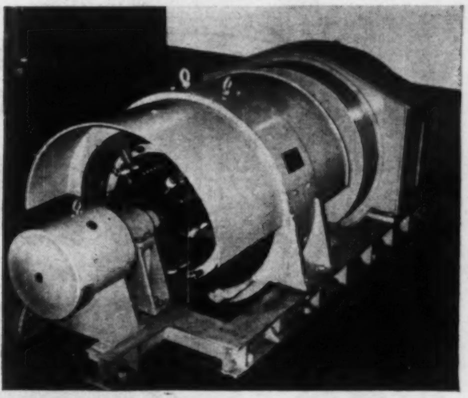


HIGHLY RESPONSIVE, amplidyne-controlled d-c motor drives 35-ton cutter. Ladder mounted and operating up to 45° tilt, it must stand vibration, jarring shocks of cutting operation.

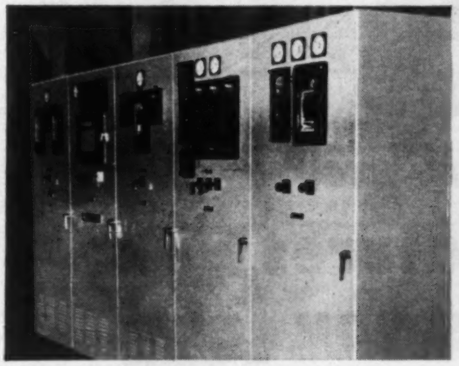




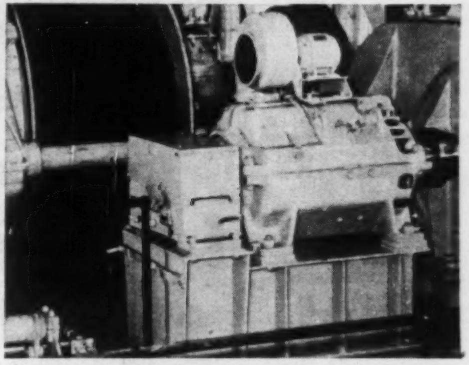
REMOTE CONTROL of dredge's auxiliary motors at centralized location is provided by General Electric remote motor controllers.



EXACT POWER NEEDS of d-c cutter motor are reliably furnished by sturdy, efficient, high-response, General Electric motor-generator set.



DEPENDABLE HIGH-VOLTAGE motor protection is provided by heavy-duty, G-E, metal-clad switchgear with draw-out circuit breakers.



COMPACT, RUGGED armored d-c motors operate ladder hoist and hauling winches, meet strict commutation and overload requirements.

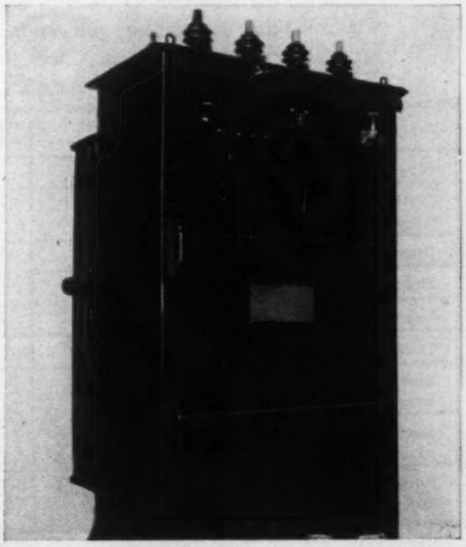
hydro-electric project

Ellicott design uses G-E equipment for more reliable performance on round-the-clock schedule

The "Hydro Québec" will operate 24 hours a day except in winter months clearing the Beauharnois Canal, a diversion of the St. Lawrence River. This project will provide more water for the expanding Quebec Hydro-Electric Commission powerhouse. Ultimately, the canal will serve as a unit of the St. Lawrence Seaway.

Long-life dependability of electrical equipment was essential to the success of the dredge on this demanding schedule. Because of this, Ellicott Machine Corp., Baltimore, Md., the builder, used G-E products in an engineered system to provide the major power components of the vessel. Years of engineering experience and skill were made available by G.E. to the customer and his consulting engineer. G-E application engineers worked closely with them to select the right equipment and combine it into the most economical, highly reliable power system for the dredge.

Productivity of heavy construction tools can be sharply increased by proper electrification. G-E engineers will work with you on design and application of electrical systems for your heavy construction equipment. Contact any G-E Apparatus Sales Office, or write General Electric Co., Section 664-34, Schenectady, N. Y.



RELIABLY SUPPLYING dredge power system, six G-E transformers filled with non-flammable Pyranol* insulating liquid reduce voltage transmitted via cable from shore substation.

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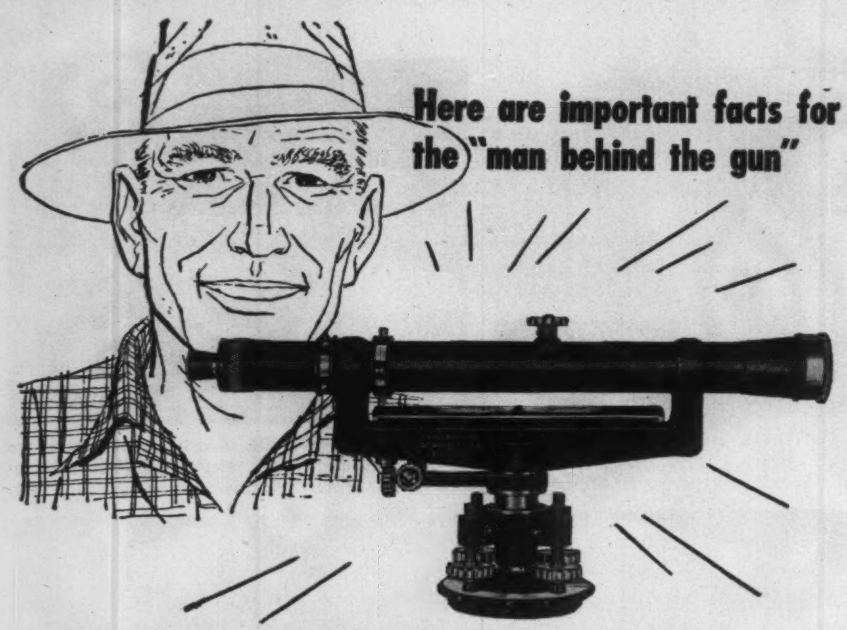
GENERAL ELECTRIC


Here are important facts for the "man behind the gun"

This White 18" Dumpy level has...

more of the features you want, yet costs you **less!**

BEFORE you buy, compare this White Dumpy level with a similar model of any other recognized make. From every standpoint — design detail . . . quality construction . . . work-speeding, life-lengthening features and cost — you'll quickly see why a White's the best buy you can make. It will make your work faster, easier, more accurate. Check this comparison chart:

FEATURES	D. White No. 7080	Instrument A	Instrument B
Magnifying power of telescope	35X	30X	27X
Distance away you can read 1/100 ft. graduation	1200 ft.	1050 ft.	900 ft.
Diameter of objective lens	1.81 in.	1.485 in.	1.69 in.
Field of view (in minutes of arc)	64′	52′	60′
Coated optics	YES	YES	YES
Covered leveling screws	YES	YES	YES
Can you easily replace worn leveling screws in the field?	YES	NO	YES
Sensitivity of level vial (in seconds of arc per 2mm of graduation)	20″	20″	25″
Price — complete with carrying case, tripod and accessories — F.O.B. factory	$295.00*	higher	higher

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For complete details on the 18-in. Dumpy level and other equally fine engineering instruments, see your David White dealer, or write direct to David White Co., 315 W. Court Street, Milwaukee 12, Wisconsin.

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BOOKS

A New Estimating Approach

Estimating Production and Construction Costs—By Louis Dallavia, 257 pp. Published by The Dallavia Co., 2110 Elmen, Houston 19, Tex. $15.00.

The new angle around which this estimator's handbook is built is a production efficiency check chart for guiding the user in rating the productivity to be expected on the job for which he is estimating costs. This chart, which is repeated 38 times throughout the book lists eight main production elements: economic conditions, volume of work, quality and supply of labor, quality of supervision, job conditions, weather, methods and equipment, incidence of delays. Each of these has three subconditions, except job conditions, which has four.

Each of these 25 elements gets three main ratings on the "production-range index" and each of the three is further subdivided into percentage ratings: low production covers 25%, 35%, 45% and 55% crew performance, average production covers 65%, 75% and 85%, and good production covers 90%, 95% and 100% crew performance.

Production range tables have been calculated for a wide range of equipment and skills and for six degrees of productivity: 25% and 45% in the low range, 65% and 80% in the average range and 90% and 100% in the good range.

A third group of tables show the operating crew and equipment on a typical shift, man days per shift for each skill used, wage rates (in 1952 in Houston, Tex.), equipment rent-ownership and operating cost per shift from which is derived the basic cost per shift. A supplementary table is computed for some 30 degrees of production per shift which shows unit labor cost, unit equipment and operating cost and total unit cost for each amount of production per shift.

The author's claim that these cost data will never go out of date is based on the provision of blanks in each of the typical shift tables whereby the user can enter his own current wage rates and equipment costs and get his own estimated total shift cost. Instructions show how to establish the user's own labor factor, equipment factor and total cost factor which can be multiplied by the unit cost selected from the precalculated tables to get the user's unit costs.

In effect, the unit cost tables here

are like tables of logarithms, they save you from calculating each value for yourself, but you have to know how to use them. Obviously there will be no substitute for judgment and knowledge of your own conditions in the successful use of this book.

The tables cover a wide range of equipment and types of construction in these main categories: earthwork, excavation and moving; reinforced concrete; structural steel; masonry; rough and finish carpentry.

This is an extremely interesting book, but one of the puzzles it leaves with the reader is this: what is the basis for the basic production data on which it is based? Is it field observations and time studies by the author? Is it manufacturer's recommendations? Is it mathematical calculations from a theoretical formula or a series of them? If so what is their basis? The book doesn't say.

Concrete Text Updated

Design of Concrete Structures—Fifth Edition. By L. C. Urquhart, the late C. E. O'Rourke and George Winter. 508 pp. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $7.50.

While still retaining the basic method of presentation and arrangement of material of earlier editions, the book has been rewritten to include many new developments and changes in design codes in the past 15 years. Since the last edition was published, Professor O'Rourke died. Professors Winter and Urquhart prepared the new edition.*

As before, the book presents material for a first course and some advanced work on reinforced concrete structures but with these changes: The treatment of rigid frames has been revised to include an expanded discussion of moment distribution. The basic principles of ultimate-load design have been incorporated in a new chapter. Also, the fundamentals of prestressed concrete-beam design have been added.

Little Dam Foolishness, Too

Big Dam Foolishness: The Problem of Modern Flood Control and Water Storage—By Elmer Peterson. 224 pp. The Devin-Adair Co., 22 East 26th St., New York 10, N. Y. $3.50.

Any and all floods can be controlled by a proper combination of farm ponds, small detention reservoirs and soil treatment, in the opinion of

Kinnear Steel Rolling Doors

Door coils above the opening, completely out of the way.

Clears the entire opening — jamb to jamb, floor to lintel.

Opened door stays out of reach of wind or vehicles.

All surrounding floor and wall space is always fully usable.

Rugged all-steel curtain repels wind, fire, theft, vandalism.

Heavily galvanized curtain gives lasting resistance to elements.

(1.25 ounces of pure zinc per square foot of metal, as per ASTM standards.) Kinnear Paint Bond — a hot phosphate immersion assures thorough, lasting paint grip.

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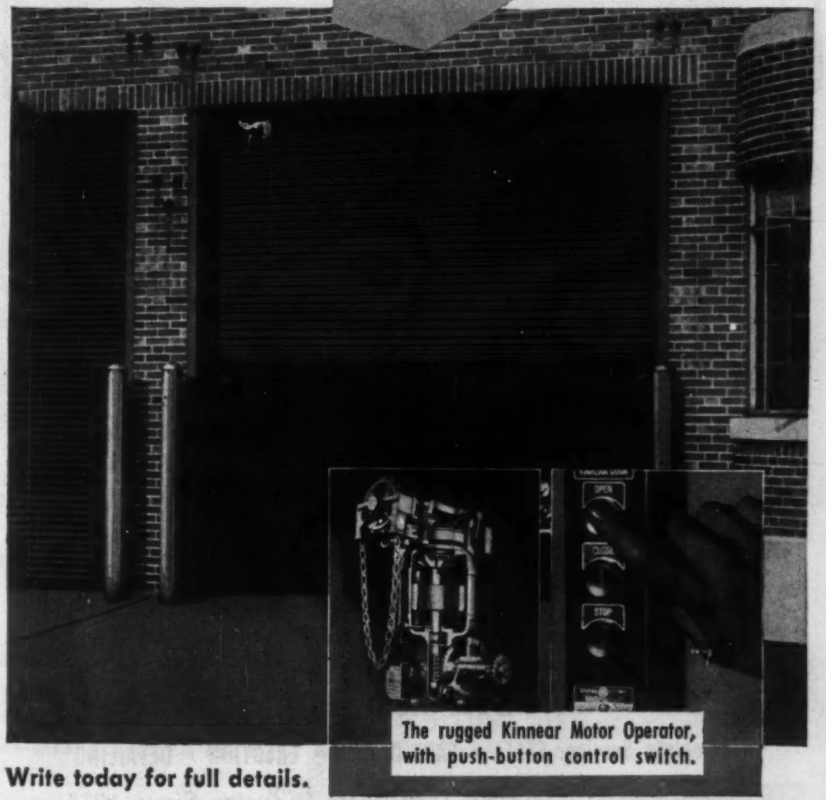
Ideal for motor operation; remote control switches if desired.

Any size; quickly, easily installed in old or new building.



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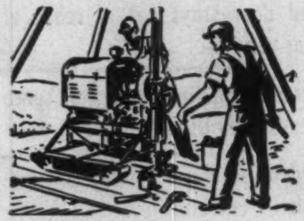

On The New York State Thruway

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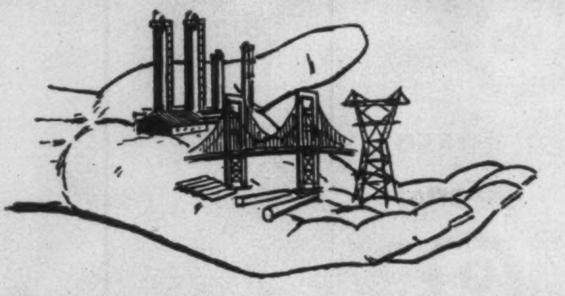

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the author. Surface runoff "is largely abnormal", he states. "When you hear anyone say 'there always have been floods and there always has been erosion,' it is well to remember that they are necessarily speaking of exceptional cases and not the prevailing normal and orderly operation of nature's own land-use program."

Against this background thinking, any large dam is "dam foolishness". And when the author comes to multiple-purpose dams, his lack of objectivity becomes even more obvious. "As though realizing that single arguments in favor of big dams scarcely can hold water, the dam planners have come up with a combination, super-special, bargain offer, dazzler of a new excuse for lacing the land with concrete. The new shibboleth, a real gem, is 'multiple purpose'. Now instead of building dams for a single purpose, they can be built for a bunch. Instead of one peril they can offer multiple perils—and paradoxes."

Among the multiple perils cited are destruction of large dams by atom bomb atacks and the contamination of whole areas by radioactive water. "Downstream communities could be wiped out in the twinkling of an eye and survivors, if any, would be attacked by deadly rays."

It is unfortunate that Mr. Peterson has taken such an impassioned and sensational approach to the question of the place of soil treatment and land use in flood control because his basic theme—the need for more control of runoff and erosion on headwater streams—is sound. A few test projects have been started to determine what can be done in a whole river valley, but many more are needed before anyone has justification for being as dogmatic as Mr. Peterson is in this book.

New Engineering Books

FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY—By A. J. Salle. 782 pp. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $8.50.

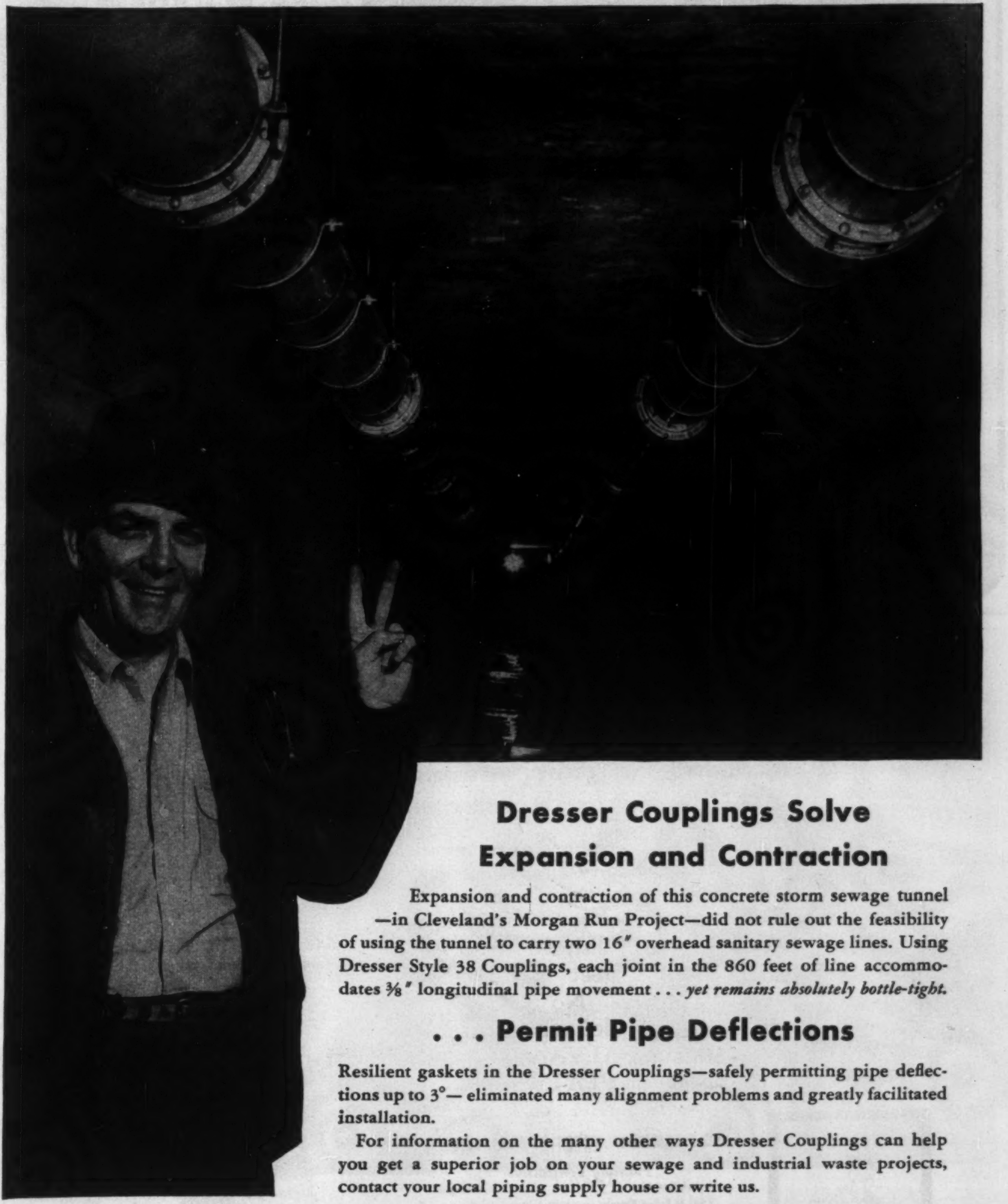
THE LIFE AND TIMES OF A HAPPY LIBERAL—A Biography of Morris Llewellyn Cook—By Kenneth E. Trombley. 270 pp. Harper & Brothers, 49 East 33rd St., New York 16, N. Y. $4.00.

FORMING AND BENDING KAISER ALUMINUM—260 pp. Kaiser Aluminum & Chemical Sales, Inc., 919 North Michigan Blvd., Chicago 11, Illinois.

MODEL ANALYSIS OF STRUCTURES — By T. M. Charlton. 142 pp. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $5.00.

(*Continued on page 180*)

DOUBLE-TIGHT!



Dresser Couplings Solve Expansion and Contraction

Expansion and contraction of this concrete storm sewage tunnel —in Cleveland's Morgan Run Project—did not rule out the feasibility of using the tunnel to carry two 16″ overhead sanitary sewage lines. Using Dresser Style 38 Couplings, each joint in the 860 feet of line accommodates ⅜″ longitudinal pipe movement . . . *yet remains absolutely bottle-tight.*

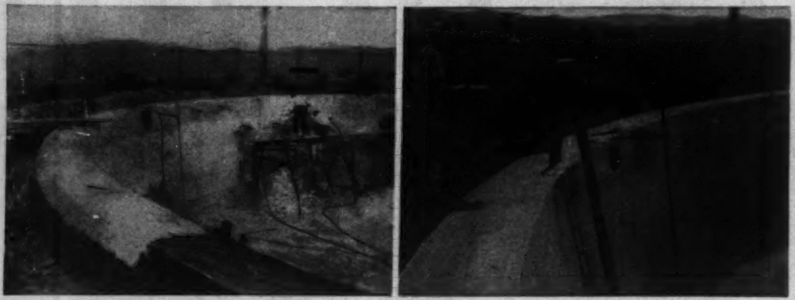
. . . Permit Pipe Deflections

Resilient gaskets in the Dresser Couplings—safely permitting pipe deflections up to 3°— eliminated many alignment problems and greatly facilitated installation.

For information on the many other ways Dresser Couplings can help you get a superior job on your sewage and industrial waste projects, contact your local piping supply house or write us.

DRESSER® COUPLINGS

Dresser Manufacturing Division, 69 Fisher Ave., Bradford, Pa. (One of the Dresser Industries). Warehouses: 1121 Rothwell St., Houston; 101 S. Airport Blvd., S. San Francisco. Sales offices also in: New York, Philadelphia, Chicago, Toronto.

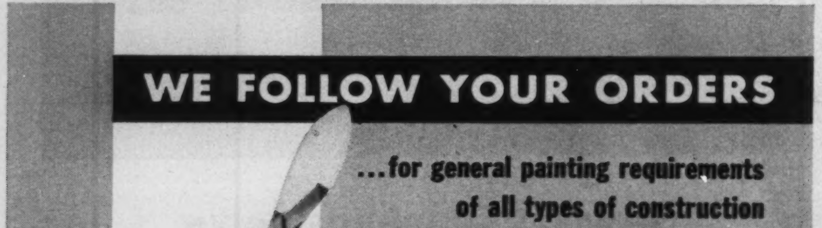


DISTINTEGRATED RESERVOIR RESTORED BY CEMENT GUN CO. WITH "GUNITE"

Climatic conditions had ruined the surface of this water storage reservoir at a Central Pennsylvania Institution. Cement Gun Company was called in to restore the structure with "Gunite." Photograph at left, above, shows our crew removing all of the disintegrated concrete prior to covering the wall with wire mesh. With reinforcing in place, "Gunite" was applied to bring the walls up to their original thickness (see photo above, right).

Complete information on many water storage reservoirs constructed or restored by Cement Gun Company are illustrated and described in our latest catalog, together with many other types of "Gunite" work we have done. A request, on your letterhead for catalog A2400 will bring your copy by return mail.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES – ALLENTOWN, PA., U. S. A.
MANUFACTURERS OF THE CEMENT GUN



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Skilled, trained and experienced personnel carry out specifications covering the work, with special requirements receiving immediate and careful attention. Throughout the South we are known for guaranteed contract performance to the Construction Industry. Contact our Miami or Atlanta office for an estimate without obligation.

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BOOKS

Laboratory Manual on Fundamental Principles of Bacteriology—By A. J. Salle. 176 pp. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $3.50.

How to Get the Most out of our Streets, Transportation and Communication Dept., Chamber of Commerce, 1615 H St., N. W., Washington 6, D. C.

Space for Industry: An analysis of Site and Location Requirements—Technical Bulletin No. 23, Urban Land Institute, 1737 K Street N. W., Washington 6, D. C. $5.00

Climatological Atlas of Canada—By Morley K. Thomas. 253 pp. Division of Building Research, National Research Council, and the Meteorological Division, Department of Transport. Obtainable from the Accounts Section, National Research Council, Ottawa, Ont., Canada. $2.00.

Reports and Pamphlets

Beach Erosion Board—Laboratory Study of Equilibrium Profiles of Beaches, Technical Memorandum No. 41; Coast Erosion and the Development of Beach Profiles, Technical Memorandum No. 44; Stability of Oscillatory Laminar Flow Along a Wall, Technical Memorandum No. 47; Sand Movement by Waves, Technical Memorandum No. 48; Bore Hole Studies of the Naturally Impounded Fill at Santa Barbara, California, Technical Memorandum No. 49; Statistical Significance of Beach Sampling Methods, Technical Memorandum No. 50; Laboratory Study of Effect of Varying Wave Periods on Beach Profiles, Technical Memorandum No. 53; Obtainable from the Beach Erosion Board, 5201 Little Falls Rd, N. W., Washington 16, D. C. Limited free distribution.

Highway Research Board—Survey and Treatment of Marsh Deposits, Bibliography No. 15 ($1.20); Highway Finance, Bibliography No. 16 ($0.75); Stabilized Turf Shoulders, Special Report 19 ($0.30; Design of Flexible Pavements, Research Report 16-13 ($1.05); Roadside Development ($1.35); Concrete Resurfacing of Concrete Pavements, Bulletin 87 ($0.60); Night Visibility, Bulletin 89 ($1.05); Vertical Land Drains, Bulletin 90 ($0.60); Highway Accidents and Related Factors, Bulletin 91 ($0.75); Obtainable from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. at the prices indicated above.

Report on Experimental Surfacings Tested on the Road Test Track at Majherhat, Alipore, Calcutta—Issued by The Indian Roads Congress, New Delhi, India. Price $0.75.

HANDS OFF! those gloves are mine!

When this operator leaves his drill the gloves tell fellow workers *to keep hands off*. And rightly so! Drill operators on construction jobs everywhere prefer powerful Chicago Pneumatic "demos" and sinkers because of their hitting ability, responsive throttling action and easy handling qualities. For details write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

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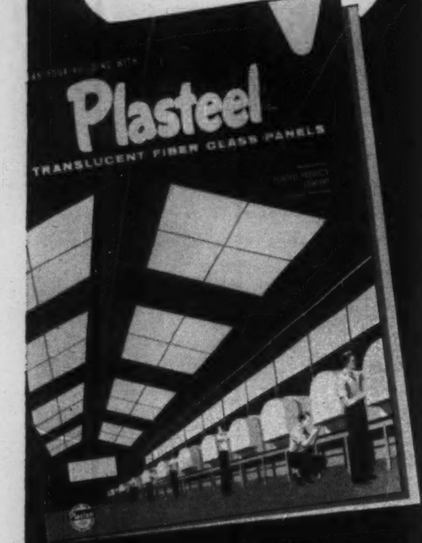

ATTENTION: ENGINEERS, ARCHITECTS, CONTRACTORS, MAINTENANCE MEN

Here is Plasteel Translucent Fiber-Glass — the panel with a thousand uses! Bring your reference files up-to-date with this interesting brochure! Also new literature available on other Plasteel Products including Roofing and Siding, Insulated Panels and Roof Deck!

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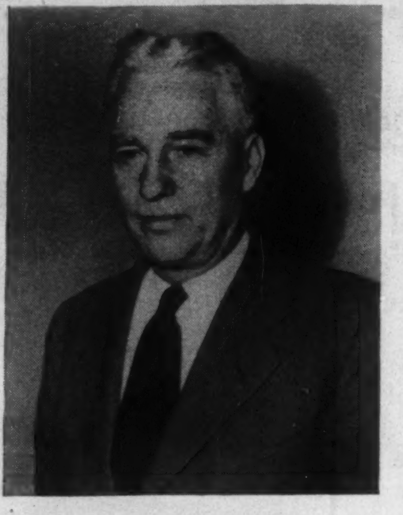
Washington, Pennsylvania

MEN AND JOBS



Williams Elected President Of National Constructors

T. C. Williams, executive vice president of Stone & Webster Engineering Corporation, Boston, has been elected president of National Constructors Association. He succeeds John F. O'Connell, vice president of The Bechtel Corporation, San Francisco.

C. D. Haxby, vice president of Rust Engineering Co., Pittsburgh, was elected vice president, and C. B. Bronson was reelected secretary-treasurer.

The National Constructors Association is composed of leading engineers and builders of chemical plants, petroleum refineries, steel mills and power plants.

Cleveland Engineering Firm Names Four Vice Presidents

The Austin Company, national engineering and construction firm with general headquarters in Cleveland, Ohio, has named four of its engineers as vice presidents: They are:

- Philip K. Davis, who has been assigned to special duties in Cleveland since 1953. After serving in the San Francisco district, he became assistant to the vice president in charge of foreign work and was later associated with naval construction in the Pacific Northwest and with large magnesium projects in Ohio and Texas.
- John N. Beckley, named eastern district manager with offices in New York and Roselle, N. J. He is a civil engineering graduate of Cornell University and joined the company in 1941.
- John H. McVey, who continues as district manager with headquarters in Los Angeles. He joined the Los Angeles district in 1934 and served as chief draftsman until his appointment as district engineer in 1944.
- Clayton L. Forster, who continues as manager of the company's Special Devices Division with headquarters in New York. Previous assignments include manager of the British subsidiary and of the Washington, D. C., office, and project manager of the army airbase in Fairbanks, Alaska.

W. E. Blomgren

Walter E. Blomgren Retires From Bureau of Reclamation

Walter E. Blomgren retired last week as assistant chief engineer of the Bureau of Reclamation at Denver, Colo. He had completed more than 42 years of government service.

His career began in 1910 with the Bureau of Reclamation's predecessor, the Reclamation Service, on the Boise Project in Idaho. After serving as division engineer on the Shoshone Project in Wyoming, he worked on irrigation systems for a consulting engineer and then became project engineer on the Office of Indian Affairs' Fort Hall Project. He returned to the Bureau of Reclamation in 1929 and was appointed regional engineer and assistant regional director prior to his promotion to assistant chief engineer.

Blomgren is opening a consulting office in Denver, specializing in irrigation and drainage problems here and abroad.

Heating Engineers Elect J. E. Haines as President

John E. Haines was elected president of The American Society of Heating and Air-Conditioning Engineers at its 61st Annual Meeting in Philadelphia.

He is vice president in charge of Commercial Controls Division, Minneapolis-Honeywell Regulator Company, Minneapolis, Minn. A chemical engineering graduate of Purdue University, Haines has spent most of his career with this company.

He is an extensive writer and lecturer on automatic controls and their application and is a director of the Producers Council.

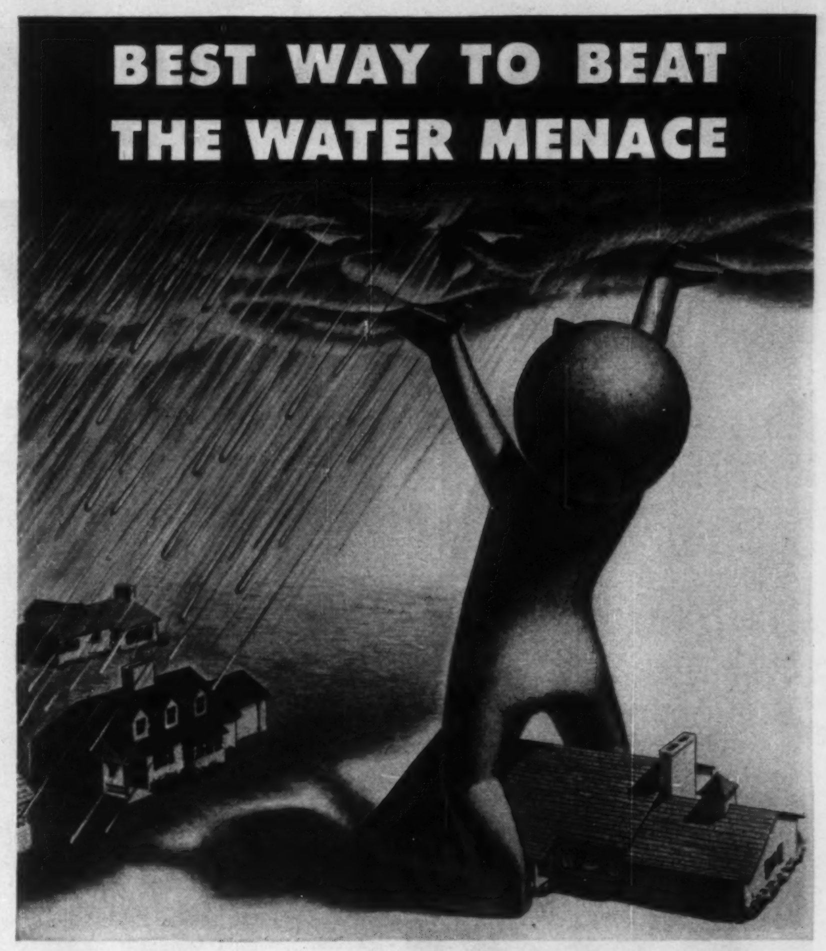
Men and Jobs Briefs . . .

- **Careers**—New director of FHA's Multi-Family Housing Division in Washington, D. C., is **Louis J. Fellenz, Jr.,** FHA director for Wisconsin . . . **Julius A. Kaestner, Jr.,** becomes city engineer of Albany, N. Y.—he's been county superintendent of highways for 14 years . . . **Herman E. Dickerson,** engineering graduate of VPI, is appointed city manager of Statesville, N. C.

- **Associations**—In California, **Gene Richards** becomes president of Excavating and Grading Contractors Assn. . . . **Harold Bewick,** Madison, Wis., is elected president of Wisconsin Builders Assn., succeeding **Glenn Webermeier** . . . **Howard B. Hicks** heads up the North Carolina Society of Engineers . . . Toncan Culvert Manufacturers Assn. elects **Lynn J. Busby** president.

- **Business**—Walter Kidde Constructors, Inc., New York and Houston, appoints **P. L. Griffith** director of industrial development . . . **Lt. Col. Walter L. Braybrooke,** former assistant chief engineer New Jersey Highway Authority, joins Goodkind & O'Dea, consulting engineers, as chief engineer . . . American Oil Co. appoints **George E. Baltchley,** 31-year veteran of the engineering department, chief engineer in charge of marketing facilities.

E. L. Hartley becomes general manager of Western Bridge and Steel Fabricators Ltd., Vancouver, B. C. . . . **Edwin B. Forster** opens his office in Los Angeles as consulting engineer . . . **Robert L. Cashen** is elected vice president of H. K. Ferguson Co. Cleveland, and becomes eastern district manager of the company.



. . . masonry water repellents made with G-E DRI-FILM® silicones

No wonder masonry water repellents containing silicones have become the standard in the industry!* They offer *lasting* protection against the Water Menace because they're *erosion resistant!* They provide "defense in depth"—penetrate masonry pores deeply to keep water out—yet permit masonry to "breathe"!

Masonry water repellents made with General Electric DRI-FILM silicones prolong the life and preserve the beauty of structures, old and new. Easily applied, they retard spalling and cracking, control efflorescence and keep surfaces cleaner.

Ask your water repellent supplier about a treatment based on G-E DRI-FILM silicones! For the names of suppliers using DRI-FILM in their products, just write to General Electric Company, Section 55-2C, Waterford, New York. (IN CANADA, write to Canadian General Electric Company, Ltd., Toronto.)

***Sales by suppliers have jumped almost one million dollars each year since 1950!**

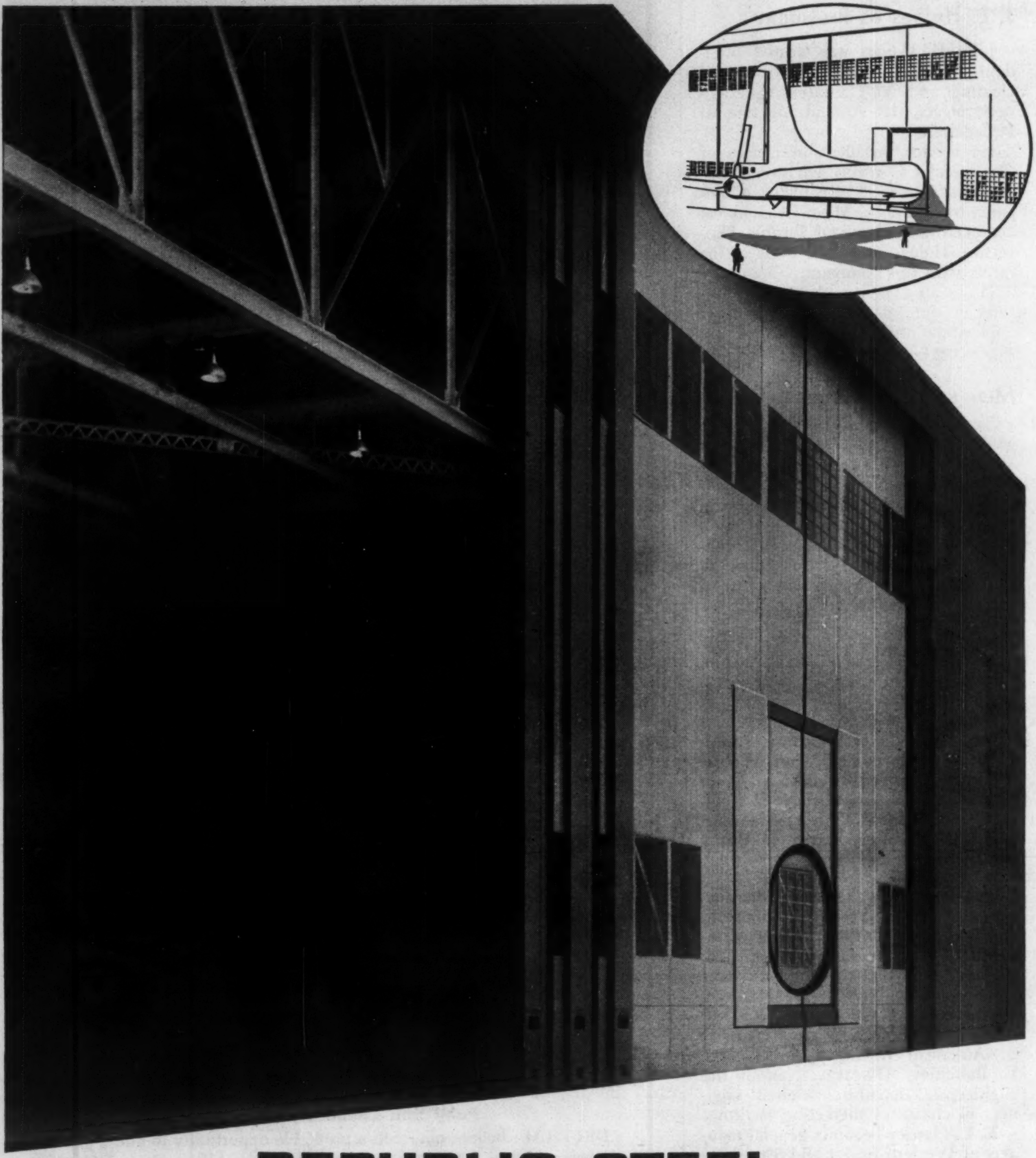
Paint and Chemical Manufacturers!

DRI-FILM silicones offer you a profitable opportunity to add a superior masonry water repellent to your product line. Ask us about DRI-FILM 103, a new G-E silicone with important manufacturing advantages!

G-E silicones fit in your future

GENERAL ELECTRIC

Truscon builds this "Door



REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

within a Door" to help you service the biggest ships

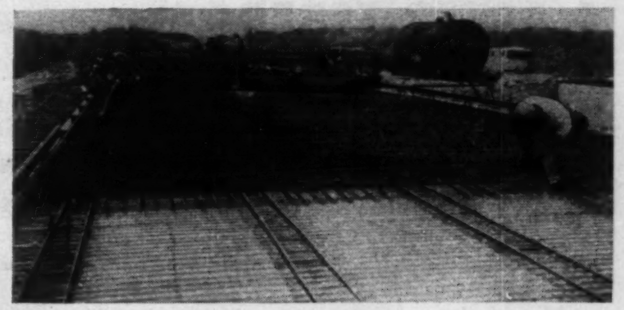
Giant Truscon Steel Hangar Doors Close Snugly Around Fuselages

In these double cantilever maintenance-type hangars, pairs of giant Truscon Straight Slide Doors close snugly *around* fuselages of the big ships. Cutout door sections and ingenious sealing device allow efficient maintenance work in any weather, with the tail assembly *outside* the hangar. Cutout door sections can be designed to fit any type or size fuselage. Foam-rubber insert allows for height variations. Twin sliding panels close when no fuselage is in the opening.

This "door within a door" provides a snug seal without damage to fuselage or tail assembly. Straight Slide Doors can be 35 to 40 feet wide, and 65 feet or more high. Fully open, a clear space 350 to 650 feet and more, in width, is possible.

Truscon makes hangar doors to fit every need, every size opening. All are products of nearly thirty years' *specialized experience* in big-door design and construction. Send coupon for details and specifications describing Truscon Straight Slide Steel Hangar Doors and other major types.

SUPERIOR VENTILATION . . . PLUS FULL WEATHERING CONTACT are plus advantages of these steel architectural projected windows made by Republic's Truscon Steel Division. Truscon's own special section provides casement-type full weathering. That's a Truscon exclusive in windows of this classification. More facts in Sweet's File; or send coupon.



REINFORCED CONCRETE RUNWAYS STAY SAFER, LAST LONGER. Runways reinforced with steel bars or welded wire fabric resist cracking, are less likely to deteriorate, to suffer from water and freezing damage, and require less maintenance. Republic's Truscon Steel Division pioneered in reinforced concrete, now offers immediate delivery of reinforcing bars and welded wire fabric through a nationwide warehouse service.

RUNWAYS STAY WATER-FREE when Republic Toncan Drainage Products are on the job. Here, Toncan Iron Sectional Plate Arch-Pipe is being installed at Cleveland Lakefront Airport. Toncan is an alloy iron. Copper and molybdenum help it resist rust better than any ferrous material in its price class. Send coupon for name of your nearest Toncan Iron Culvert manufacturer.

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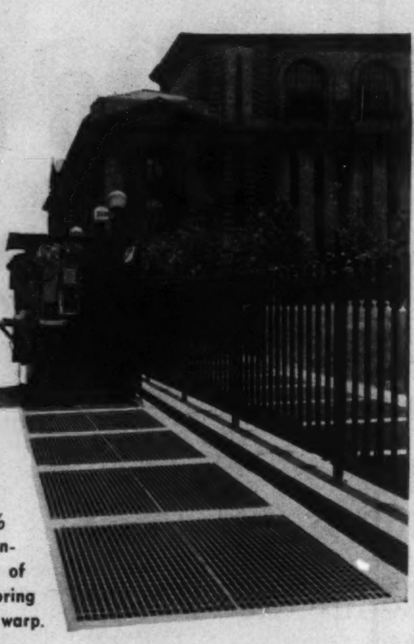
LEVEL—
BEST!



That's right! You can always be sure Hendrick Mitco Open Steel Flooring will provide a level walking surface both safe and strong. Ideal for flooring or walkways between buildings, its rectangular, square-edged steel bars provide tops in rigidity yet leave 90% open area for light and air. Made into integral panels under hundreds of tons of hydraulic pressure, Hendrick Steel Flooring has no bolts, rivets or welds to stress or warp.

And more! For extra heavy industrial usage it's available in Heavy-Duty Steel Grating. For more complete details write to Hendrick, today!

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4 ACKER TEREDOS' drill 'round the clock for 3 months

In building the new Almendares Vehicular Tunnel between Vedado and Miramar (two popular communities in Havana, Cuba) four Acker Hydraulic Feed Core drills were used for drilling grout holes. Working *around the clock for almost three months,* the four Ackers showed little sign of wear.

Rugged construction, simplicity of operation and the many exclusive features that Acker designed and developed during the past 30 years.

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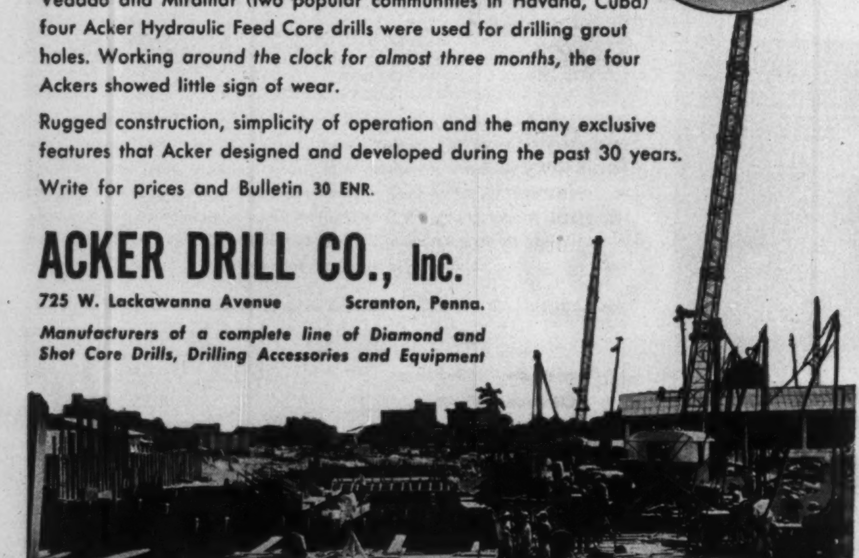
Manufacturers of a complete line of Diamond and Shot Core Drills, Drilling Accessories and Equipment



OBITUARIES

Carl O. Johnson, 70, assistant bridge engineer in Chicago's Department of Public Works, died Jan. 29. A veteran of 48 years service in the city's division of bridges, he supervised construction of a number of heavy bascule bridges over the Chicago River and for the past 10 years had been in charge of all bridge construction for the city. He received his civil engineering degree from Armour Institute of Technology in 1906.

Frederick K. Wing, 85, former Buffalo, N. Y., city engineer and a pioneer in sewage-disposal development in the Buffalo area, died Jan. 27. One of his projects was building the first disposal plant and sewer system in the Buffalo area, at Depew. He was graduated from Cornell University in 1890 and five years later founded Frederick K. Wing Co., civil engineers and surveyors. From 1935 to 1937 he served as chief engineer for the Niagara Frontier Planning Board.

Walter S. McDowell, former New York State highway bridge engineer, died Jan. 26 in Albany, N. Y. Before retirement he was an associate engineer of highway bridges with the State Public Works Department. He was a graduate of Columbia University.

Alan A. Wood, 63, a civil engineer and president-treasurer of Alan A. Wood, Inc., Philadelphia, died Jan. 29. He was graduated from Brown University in 1911 and started his career as a sales engineer at Builders Iron Foundry, Providence, R. I.

Harry A. Washburn, 69, former civil engineer for the Texas Co., died Jan. 30 in Houston, Texas. Before retirement he served for 33 years in the company's production department.

Edgar W. Hauser, 54, president of E. W. Hauser Construction Co., Indianapolis industrial and commercial builder, died Dec. 16. His firm's construction projects include the Star-News building, the Sears, Roebuck & Co. store, and the Indianapolis Chevrolet plant.

William Grant, 66, veteran Akron, Ohio, civil engineer, died Jan. 14. In recent years he worked for the Cuyahoga Falls, Ohio, water and engineering departments and for Heslop Development Co. Forty years ago he was an engineer with the firm that installed the viaduct over the Cuyahoga River at Akron.

Check the looks!

Try the comfort!

Then, to get the most for your money

LOOK UNDER THE HOOD!

A revolution in truck power is taking place . . . sparked by the Ford Short-Stroke V-8!

When a new type of engine prolongs piston ring life as much as 53% . . . gives gas savings of up to 1 gallon in 7 . . . cuts engine friction as much as 33% to liberate more *usable hauling power*, you know it's bound to go over big with economy-minded truck users.

A new MONEY MAKER for heavy construction work—the '55 Ford T-800 Tandem Axle BIG JOB! Powered by the mighty Short-Stroke 170-h.p. *Cargo King* V-8, it is rated for 40,000 lbs. GVW, 60,000 lbs. GCW. *Master-Guide* Power Steering is standard equipment!

Small wonder, then, that the truck industry is now investing millions of dollars *under the hood* . . . in a revolutionary switch to Short-Stroke V-8's.

But Ford, pioneer in V-8 truck power, made the switch over three years ago. And right *now*, you'll find a *proven*, modern Short-Stroke engine under the hood of every Ford Truck. Only Ford offers a full line of Short-Stroke engines . . . four V-8's and a Six.

Make sure your next truck is a modern Money Maker. Look *under the hood!* Look for a modern Short-Stroke engine with a "stroke" as short as, or shorter than its "bore." And remember, you get the full advantages of Short-Stroke design *today* in any Ford Truck you choose.

Call your Ford Dealer or write: Ford Division, Ford Motor Co., Dept. T-11, Box 658, Dearborn, Mich.

FORD

Triple Economy

TRUCKS ***THE MONEY MAKERS FOR '55***

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. O. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

† **Conn., West Haven**—STORAGE FACILITIES—BA 2/21—Veterans Administration Hospital Manager, W. Spring St., Inv. 76, storage facilities Veterans Administration Hospital. CD 1/5/49, under Public Buildings.

R. I., Woonsocket—BA 2/24—City Housing Auth., 2 Bourdon Blvd., replace water pipes, Morin Heights Housing Proj. Plans deposit $25.

BIDS ASKED—BUILDINGS

Conn., Meriden—SCHOOL—BA 2/24—City, Allyn D. Chabot, chn. School Bldg. Comn., Meriden, 1 story, elementary school, Baldwin Ave. $500,000. Plans deposit $50. Sherwood, Mills & Smith, 65 Broad St., Stamford, archts. CD 2/2.

† **Me., Charleston**—POST EXCHANGE and RECREATION BLDG.—BA 2/24—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., post exchange recreation bldg., utilities, westerly ridge of Bull Hill, ENG-19-016-55-68. $50,000-$100,000.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Ralph Richard Co., 17 Poplar St., Roslindale, Mass. LB **$367,087**, est. $345,000. Contr. 1A drainage sys., Carter St. northeast Expressway, Chelsea;

Bradford Weston, Inc., 116 Rockland St., Hingham, Mass. LB **$89,227**, est. $120,000. hy. reconstr., Marshfield. Bids Feb. 1. CD 1/19.

BUILDINGS

LOW BIDS AND CONTRACTS

Town, c/o Myron Billings, supt. Schools, High St., Hudson, Mass. contract withdrawn. high school Packard St., HUDSON, MASS. CA **$599,049**. CD 1/4, under CA.

▲ **C. Sullivan Co., Inc.**, 594 Thames St., Newport, R. I., LB **$2,140,888**. Rogers HIGH SCHOOL, off Ruggles Ave., NEWPORT, R. I. City, Supt. Schools, Newport, R. I. Bids Feb. 2. CD 1/4.

Jefferson Constr. Co., 75 1 St., Cambridge, Mass., LB, **$985,294**, combined bid, Southport Elementary SCHOOL and Holland Hill SCHOOL;

L. B. Palmer-Tarinelli Constr. Co., 144 Island Brook Ave., Bridgeport, Conn., LB, **$420,000**, for Southport SCHOOL;

E. & F. Constr. Co., 94 Wells St., Bridgeport, Conn., LB, **$560,000**, Holland Hill SCHOOL, FAIRFIELD, CONN. Town, School Bldg. Comn., Town Hall, Fairfield, Conn. Bids Jan. 31. CD 1/18.

New Canaan Bldg. Co., 14 South Ave., New Canaan, Conn., CA, **$350,000**, brick veneer 22 APARTMENTS, NEW CANAAN, CONN. J. Elliott Smith Apartments, Inc., c/o contractor.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

† **N. Y., Mitchel Field**—RESURFACING—BA 2/24—Base Purch. & Contg. Office, Bldg. T-117, Mitchel Air Force Base, resurf. with b. conc. and tar rubber, replacing deteriorated concrete slabs of East-West Taxiway and apron, No. 30-601-55-32-"B". CD 9/14/51.

N. J., Teterboro—ADMINISTRATION BLDG.—BA 3/8—The Port of New York Auth., 111 Eighth Ave., New York 11, N. Y., Contract TA-230.003, Administration Bldg., at Teterboro Airport. Plans deposit $30. CD 1/18/54.

New York—ROAD WIDENING—BA 3/8—At office Chief Engineer, of The Port of New York Auth., 111 8th Ave., New York, Zone 11, Contr. LT-160.022, widening West 41st St. from Dyer to Tenth Aves., Lincoln Tunnel, Third Tube. Plans deposit $30. CD 1/18/54.

N. Y., Idlewild—BUILDING—BA 3/8—At Office Chief Engineer, of The Port of New York Auth., 111 8th Ave., New York Zone 11, Contr. NYA-570.001, constr. of Building No. 143, New York International Airport. Plans deposit $30. CD 1/18/54.

BIDS ASKED—BUILDINGS

▲ **Md., Rockville**—SCHOOL — BA 3/3 — Montgomery Co., Bd. Educ., Wheaton Junior High School, Wheaton, $1,028,000. Plans deposit $40. McLeod & Ferrara, 1741 DeSales St. N.W., Wash., D. C., archts. CD 2/2/53.

† **Pa., Phila.**—STEAM GENERATING DISTRIBUTION SYS.—BA On Or About 3/8—U. S. Eng., 2635 Abbottsford Ave., rehabilitation, expansion of steam generating and distr. sys., Frankford Arsenal, ENG-36-109-55-43. CD 4/16.

N. Y., New York--POWER PLANT—BA 3/10—Henry A. Cohen, dir. Bureau Contracts & Accounts, Dpt. P. Wks., The Governor Alfred E. Smith State Office Bldg., Albany, constr., heating, sanitary and electric work for power plant Bldg. No. 122, Manhattan State Hospital, Wards Island. Plans deposit $40 each, constr. and heating; $10 sanitary, $20 electric.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ † **Bero Constr. Corp.**, 259 Delaware Ave., Buffalo 2, N. Y., CA **$3,606,077**, air force facilities (FY 1955) paving, grading, incl. addnl. airfield pavement as exten. to existing runways, taxiways and apron constructed by others, incl. clearing, grubbing, grading, subgrade, road tests, drainage, installing apron appurtenances, install flush type fire hydrants, water mains, paving taxiway shoulders, constr. blast pads and area seeding at Air Force Base, Serial No. ENG-30-075-55-205, PLATTSBURGH, N. Y. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Bids Jan. 11. CD 1/6.

† **Arthur Venneri Co.**, 300 North Ave., Westfield, N.J. CA **$170,700**, dental clinic, Plattsburgh Air Force Base, ENG-30-075-55-198, PLATTSBURGH, N. Y. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Bids Jan. 5. (**Correction**—contractor and price). CD 1/27, under CA.

▲ **NEW JERSEY**—State Hy. Dpt., State Hy. Office Bldg., 1035 Parkway Ave., Trenton

J. F. Chapman & Son, Inc., 612 Glenwood Ave. Hillside, N. J., CA, **$1,822,804**, grading, bridges, paving 1.581 mi. Route 29 extension (East-West Freeway) Trenton, Mercer Co. Bids Dec. 30. CD 1/4, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Krown Builders**, 19 Linden St., Garden City, N. Y. Owner Builds. **$1,800,000**. 60 HOUSES, Stratton Rd., near Weaver St., NEW ROCHELLE, N. Y.

▲ **Segal & Segal**, 6 Sloan St., South Orange, N. J., Owner Builds, **$1,350,000**. Garden APARTMENT for 172 families on 14-acre tract at South St. and The Circle, NEW PROVIDENCE, N. J.

Merville Dean, Hollywood, Md. LB **$499,380**, est. $465,000. Great Mills High School addn., alterations, Great Mills, LEONARDTOWN, MD. St. Mary's Co. Bd. Educ., Leonardtown, Md. Bids Feb. 1. CD 1/11.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

† **S. C., Sumter**—PARKING APRON—BA 2/23—U. S. Eng., Custom House, Charleston, paving aircraft parking apron exten. Shaw Air Force Base, No. 38-081-55-34. CD 1/25.

† **N. C. Edenton**—ROADS and PARKING AREAS—BA 2/24—P. Wks. Office, Fifth Naval. Dist., U. S. Naval Base, Norfolk 11, Va., repairs to roads, parking areas and ditches, Marine Corps Auxiliary Landing Field, NOY 85931. Spec. 43106. Plans deposit $20.

† **Va., Portsmouth**—REPAIRS TO ROOFS—BA 2/24—P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk Zone 11, repairs to roofs, Bldg. 261, Norfolk Naval Shipyard, NOY 86540. Spec. 45288. Plans deposit $10.

† **Ga., Marietta**—OPERATIONS BLDG., etc.—BA About 2/27—U. S. Eng., 200 E. St. Julian St., Savannah, AC & W operations bldg., incl. grading, paving, drainage, grassing, necessary utilities, Dobbins Air Force Base. CD 11/12/53.

† **Florida**—BA About 3/1—U. S. Eng., P. O. Box 4970 Jacksonville, constr. Levee 2, Section 1, Central & Southern Florida Flood Control Proj. CIVENG-08-123-55-34. **Extended date.** CD 1/14.

Fla., Tampa—BA 3/1—Bd. Representatives, City Hall, constr. sewer impvs. and trunk sewers with all appurtenances. Plans deposit $25 for each. Greeley & Hansen 220 S. State St., Chicago, Ill., engrs. CD 10/27/53.

† **Fla., Eglin Air Force Base**—MAGAZINE—BA 3/3—U. S. Eng., P. O. Box 1169, Mobile, Ala., ammun-segregated and pyrotech magazines, Auxiliary Field 9, ENG-01-076-55-84B.

† **La, Shreveport**—ORGANIZATIONAL MAINTENANCE SHOP—BA 3/9—U. S. Eng., P. O. Box 867, Little Rock, Ark., constr. 4,600 sq. ft. masonry organizational maintenance shop, demolition and remodel igloos, Barksdale Air Force Base, ENG-03-050-55-81, $100,000. CD 2/1.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NORTH CAROLINA—State Hy. & P. Wks. Comn., Raleigh,

rejected bids Jan. 25, structures on 16.5 mi. relocation of US 70 between New Bern and Havelock, Hy. Proj. 2151. F-168 (11), Craven Co. LB **$106,764;** structures on 5.52 mi. NC 24 from US 17 in Jacksonville to Main Gate at Camp Lejeune, Hy. Proj. 3697. D-AD-F-3 (2), Onslow Co. LB **$96,290**. Will re-advertise. CD 1/28, under LB.

† **Arrow Plumbing & Heating Co.**, Durham, N. C., LB **$103,635**, rehabilitation of utilities, Marine Corps Auxiliary Landing Field, NOY 85929, Spec. 43104, EDENTON, N. C. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. Bids Feb. 1. CD 1/13.

▲ **Thomas D. Nolan**, 4017 S. Brook St., Louisville, Ky., LB, **$4,578,390**. sewerage collection sys. impvs., lift stations, force mains, sewage treatment plant and outfall within the limits of city, NORTH MIAMI, FLA. City, City Hall, North Miami, Fla. Bids Feb. 1. CD 1/21.

† **Mills & Jones, Inc.**, 2260 4 Ave. S., St. Petersburg, Fla., CA, **$113,223**, parachute bldg., MacDill Air Force Base ENG-08-123-55-37, TAMPA, FLA., U. S. Eng., P. O. Box 4970, Jacksonville, Fla. Bids Jan. 6., awarded Jan. 14. CD 11/26.

BUILDINGS

LOW BIDS AND CONTRACTS

John W. Daniel & Co., Danville, Va., LB **$418,000**. elementary SCHOOL, Fox's Store Area, HAMPTON, VA. Hampton School Bd., C. Lindsay Alton, supt., Hampton, Va. Bids Feb. 1. CD 1/19.

Congaree Constr. Co., 3530 Colony Forest Dr., Columbia, S. C., LB **$558,000**. men's RESIDENCE HALLS, Units D, E, F and G, COLUMBIA, S. C. University of South Carolina, Columbia, S. C. Bids Jan. 20. CD 1/7.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

Ind., Indianapolis—BA 3/7—Ben Davis Conservancy District, L. E. Caldwell, pres., 4808 W. Washington St., sewerage sys., Div. 1, sanitary sewers, pumping station storm sewers. $300,000. Plans deposit $50. J. B. Wilson, 524 Ind. Pythian Bldg., Zone 4, consult. engr.

† **O., Columbus**—BUILDINGS, etc.—BA On Or About 3/22—U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va. 4 squadron operations bldgs., 4 organizational maintenance shops, 1 ammunition shop, 1 small arms

(Continued on page 190)

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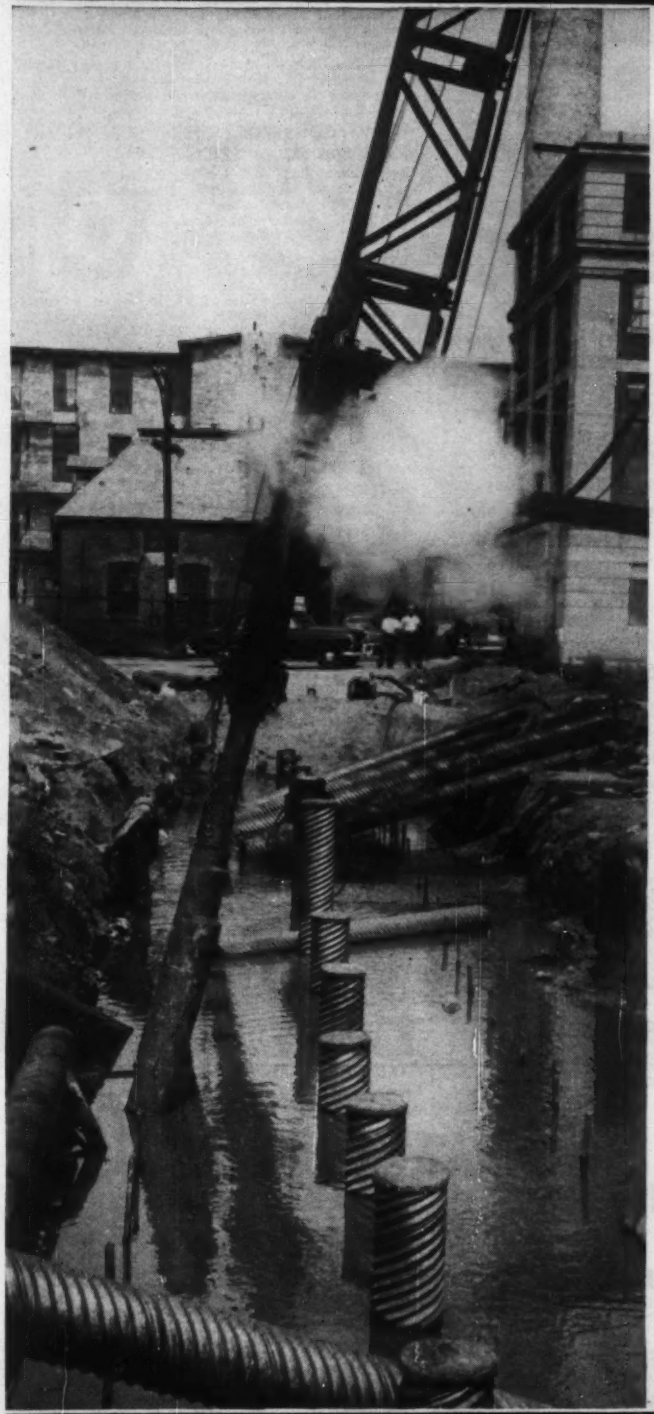

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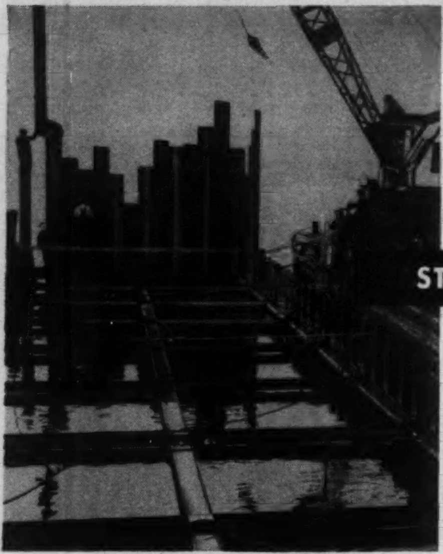

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(Continued from page 188)

magazine, 4 concrete igloos,, 1 cold storage bldg. and appurtenance facilities, Lockbourne Air Force Base, Serial No. ENG-46-022-55-12.

INDIANA—BA 3/30—Indiana Toll Road Comn., 309 W. Washington St., Indianapolis, Zone 4,
Contracts 3 and 4, Indiana East-West Northern Toll Road. CD 2/10/54.

INDIANA—BA 4/13—Indiana Toll Road Comn., 309 W. Washington St., Indianapolis, Zone 4,
Contracts 5 and 6, Indiana East-West Northern Toll Road. CD 2/10/54

INDIANA—BA 6/1—Indiana Toll Road Comn., 309 W. Washington St., Indianapolis, Zone 4,
Contracts 1 A, Indiana East-West Northern Toll Road. CD 2/10/54.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Burch Constr. Co., 2445 Neff St., Dayton, O., CA **$474,515**, Northridge Sewer District, Contr. II, sanitary sewers and water mains for Sect. 2, DAYTON, O. Comrs. Montgomery Co., Court House, Dayton, O. Bids Dec. 15, awarded Jan. 20. CD 11/23.

† **Construction Management, Inc.**, 1542 W. Washington St., Indianapolis, Ind., LB **$158,475**, replacement of two boilers and conversion of third to oil, Veterans Administration Hospital, Cold Spring Rd., INDIANAPOLIS, IND. Veterans Admin., Munitions Bldg., Wash., 25, D. C. Bids Jan. 11. CD 11/30.

Birmingham Constr. Co., 208 Savings & Loan Bldg., Birmingham, Mich. CA **$121,000**, pumping station;
Chicago Bridge & Iron Co., 1204 Lafayette Bldg., Detroit, Mich. CA **$118,400**, storage reservoir;
Geo. Tripp, Inc., Flint, Mich. CA **$220,285** Sect. 1, **$149,602** Sect. 2, water feeders, ROSEVILLE, MICH. Village, Robert Nunn, clk., 2700 Gratiot St., Roseville, Mich. Grand total $609,287. Bids Jan. 10. CD 12/27.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Midwest Builders**, Leo Goldberg, pres., 2199 S. Green Rd., Cleveland, O. Owner Builds. **$10,000,000**. 480 frame, full bsmnt. DWELLINGS, Mayfield Rd. near SOM Center Rd.; **$2,000,000**. SHOPPING CENTER to house 18 stores, bowling alley, parking for 1,500 cars, Mayfield Rd. near SOM Center Rd., MAYFIELD HEIGHTS, O.

Hellrung Constr. Co., 101 Cherry St., Alton, Ill., LB, **$760,500** general contract brick, steel, concrete, masonry block JUNIOR HIGH SCHOOL, ALTON, ILL. Alton Community Unit School Dist. No. 11, Bd. Educ., Haskell House, 1211 Henry St., Alton, Ill. Bids Jan. 26. CD 1/5.

Darin & Armstrong, Inc., 2041 Fenkell St., Detroit, Mich., CA Est. **$500,000** SUB-STATIONS 23, 24, 25, incl. walkway and north wall of Bldg. 13, FLINT, MICH. Fisher Body Div. General Motors Corp., c/o General Motors Bldg., Detroit, Mich. Boddy-Benjamin & Woodhouse, Inc., 210 Park St., Detroit, Mich., engr.

Leo McPartland, 2710 Northwest Ave., Lansing, Mich. CA Est. **$720,000**. 60 single brick, frame HOUSES, LANSING, MICH. George W. Miller Co., 2710 Northwest Ave., Lansing, Mich.

▲ **Curtis Building Co.**, 8120 Buckingham St., Allen Park, Mich. Owner Builds. **$1,170,000**. Balfour Park Subdivision, 75 brick ranch HOUSES, Salem, Acacai, Sarasota Sts., REDFORD, MICH.

Erin Twp. School Dist. No. 6, 18320 Eastland Ave., Roseville, Mich., rejected bids Jan. 17, Wexford Elementary School, Wexford Ave. and John J. St., Mich. 54-C-25 AA, ROSEVILLE, MICH. Will re-advertise. CD 12/28.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

Kan., Wichita—BA 2/24—Boeing Airplane Co. Plant No. II, Personnel Bldg., water purification sys. under special Facilities Contr. W33-028-AC-21378, Govt. Aircraft Assembly Plant No. 13. Plans deposit $25. Wilson & Co., 705 E. Crawford St., Salina, engrs. and archts.

† **Neb., Lincoln**—LIGHTING—BA 2/24—U. S. Eng., 1709 Jackson St., Omaha, Zone 2, constr. A-3 taxiway lighting, Lincoln Air Force Base, ENG-25-066-55-69. CD 8/5.

† **Texas**—BA 2/25—U. S. Eng., P.O. Box 1229, Galveston, cathodic protection, Beaumont Reserve Fleet Site, McFadden Bend-Neches River, constr. overhead-underground and submarine 3-phase 4,160-volt transmission line, etc., CIVENG-41-243-55-38B. CD 2/2.

† **Tex., Abilene**—RAILWAY TRACK—BA 2/26—U. S. Eng., Box 1600, Fort Worth, railway standard gage track, Abilene Air Force Base, ENG-41-443-55-79. $75,000.

† **Tex., Killeen**—WARM-UP PAD—BA 3/3—U. S. Eng., Box 1600, Fort Worth, aircraft warm-up pad, 14,000 sq. yd. heavy duty paving, 30,000 cu. yd. excav., drainage, etc., ENG-41-443-55-80. $90,000. CD 8/17/51.

† **Montana**—BA 3/8—Bureau Reclamation, Dpt. Interior, Hungry Horse Govt. Camp, Columbia Falls, furnishing labor and materials for Hungry Horse Dam River Channel imprv. and bank protection Hungry Horse Proj., near Columbia Falls, Spec. DC-4349; adv. ENR 3/17.

† **S. D., Rapid City**—GAS SYS., etc.—BA On Or About 3/8—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., base gas distr. sys. and conversion of heating plant, incl. (a) 118 lin. ft. 1¼- to 12-in. gas line (b) 1,000 lin. ft. encasement pipe (c) 400 service assemblies (d) cathodic protection (e) regulating and metering stations (f) telemetering equipment (g) seeding

(Continued on page 192)

Mack Model LRSW working under a 4-yard shovel on the *tough* Ardsley-Tarrytown section of New York Thruway.

big shovels call for big trucks

Today's big-yardage jobs demand maximum loads per haul and faster time cycles from shovel to dumping point and return. Increasing use of big 4- and 5-yard shovels points to the Mack Model LRSW six-wheel dump truck as the answer to these stepped-up requirements.

Here's a truck that's built to keep big shovels on the go . . . to give contractors increased production per driver and per truck dollar invested.

Rated at 30 tons payload capacity, it will move 25 heaped yards with unfaltering ease over the toughest terrain. No miring in with Model LRSW—it has the advantage of Mack's Balanced Bogie with exclusive Power Divider, enabling it to pull through where other trucks bog down. In actual service Model LRSW has demonstrated its ability to maintain the time schedule of smaller-capacity dumpers.

Why not investigate the big-unit economy of Mack Model LRSW. It will pay you to see these big jobs at work.

MACK TRUCKS Empire State Building, New York 1, N. Y.

2925

(Continued from page 190)

and mulching (h) 340 conversion heating units (i) 140 conversion water heaters, Ellsworth Air Force Base, Inv. No. ENG-25-066-55-59. Plans deposit $50. CD 11/12/51.

† **South Dakota** — SUPERVISORY CONTROL, etc. — BA 3/15—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Watertown and Groton, Schedule 1, Item 1, one controlling-station supervisory control and telemetering switchboard and associated equipment for Watertown substation for the supervisory control of Groton sub-station and for receiving telemetered quantities from Groton sub-station, shall be furnished complete; Item 2, one controlled-station supervisory control and telemetering switchboard and associated equipment for Groton substation for supervisory control of Groton sub-station from Watertown sub-station and for transmitting telemetered quantities from Groton sub-station to Watertown sub-station, shall be furnished complete, DS 4345.

† **Okla., Altus**—MEAT CUTTING and COLD STORAGE BLDG.—BA 3/16—U. S. Eng., Box 61, Tulsa, Zone 2, approx. 7,000 sq. ft. masonry meat cutting and cold storage bldg., incl. exterior utilities, Altus Air Force Base, ENG-55-58. CD 6/27/51.

▲† **Tex., Waco**—PARKING PAVEMENT—BA 3/17—U. S. Eng., Box 1600, Fort Worth, light duty concrete pavement for operational parking apron strengthening, 81,251 sq. yd.; warm-up pads, runways, taxiways, concrete paving 800,000 sq. yd., James Connally Air Force Base, ENG-41-443-55-82. $1,250,000-$2,750,000. CD 8/6/51.

† **Tex., Mineral Wells**—CLUB, MESS—BA 3/29—U. S. Eng., Box 1600, Fort Worth, masonry airmen's club and officers' mess, Wolters Air Force Base, ENG-41-443-55-86. $190,000. CD 7/16/51.

▲ **TEXAS**—Bids Asked—Texas Turnpike Co., W. L. Pickens, pres., 1408 Magnolia Blvd., Dallas, (selected list of bidders).

223 mi. four-lane Turnpike Toll Rd. from Fort Worth to Dallas. $85,000,000. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York 6, N. Y., traffic consults. and engrs. DeLeuw, Cather & Co., 150 N. Wacker Dr., Chicago 6, Ill., engrs. CD 2/16/50.

BIDS ASKED—BUILDINGS

Tex., Elgin—PLANT—Bids Asked—Elgin Brick & Tile Co., Elgin, brick and tile mfg. plant. $250,000. CD 1/31.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

City, M. Trovaten, clk., City Hall, Barnesville, Minn. rejected bids Dec. 1. furnish, install diesel engine generator unit with auxiliaries, accessories and piping at municipal power plant, BARNESVILLE, MINN. Will re-advertise. CD 11/17.

Thornton Bros. Co., 1343 Dayton Ave., St. Paul, Minn. LB **$124,000.** install 30 in. and 24 in. water mains in various streets, ST. PAUL, MINN. City, L. E. Kinvig, city purch. agt., 253 City Hall, St. Paul, Minn. Bids Feb. 1. CD 1/27.

† **Pioneer Contg. Co., Inc.**, 453 Plum St., Memphis, Tenn., CA, **$157,014**, Levee Item WR-L-47, Ratio, White River Drainage District, Phillips and Desha Counties, CIVENG-40-041-55-90, ARKANSAS. U. S. Eng., P. O. Box 97, Memphis 1, Tenn. Bids Jan. 18. CD 12/14.

† **Dickmann, Pickens & Bond**, Gazette Bldg., Little Rock, Ark., CA, **$597,849**, est. $627,035 rehabilitation of Air National Guard facilities, Municipal Airport. ENG-3-050-55-74, FORT SMITH, ARK. U. S. Eng., P. O. Box 867, Little Rock, Ark. Awarded Jan. 21. CD 1/28, under LB.

† **G. W. L. Constr. Co.**, 12 S. Virginia St., Oklahoma City, Okla., LB, **$112,653**, est. $130,000 A.I.O. SHOP, Little Rock Air Force Base, ENG-03-050-55-31, JACKSONVILLE, ARK. U. S. Eng., P. O. Box 867, Little Rock, Ark. Bids Jan. 26. CD 1/3.

† **P. L. Richardson**, 224 N. Garnes St., Little Rock, Ark., LB, **$110,083**, est. $130,734 parachute bldg., Little Rock Air Force Base, ENG-03-050-55-71, JACKSONVILLE, ARK. U. S. Eng., P. O. Box 867, Little Rock, Ark. Bids Jan. 27. CD 1/3.

† **Milo J. Choate Inc.**, 1412 W. 5 St., Tyler, Tex., LB, **$259,597**, est. $247,650 armament and electronics repair shop, Little Rock Air Force Base, ENG-03-050-55-70, JACKSONVILLE, ARK. U. S. Eng., P.O. Box 867, Little Rock, Ark. Bids Jan. 28. CD 1/12.

† **Milo J. Choate Inc.**, 1412 W. 5 St., Tyler, Tex., LB **$367,429**, est. $401,384. organizational maintenance shops, Little Rock Air Force Base, ENG-03-050-55-76, JACKSONVILLE, ARK. U. S. Eng., P. O. Box 867, Little Rock, Ark. Bids Jan. 27. CD 1/3.

Wharton County Electric Co-operative, El Campo, Tex. Own Forces. **$125,000**, rural distr. lines, El Campo, TEXAS. CD 6/9/48.

Swilling Boyd, Box 96, Whitney, Tex., LB **$194,356**, est. $130,000 Contr. "B", Spec. 130-54, water distr. sys. and sanitary sewer collection sys.;

Mitchell Darby Constr. Co., Box 447, Pharr, Tex., LB **$66,855**, est. $60,000 Contr. "C", Spec. 131-54, water plant imprvs., expansion, CROCKETT, TEX. City, Crockett, Tex. Bids Jan. 27. CD 1/12.

Utilities Constr. Co., 315 W. 13 St., Fort Worth, Tex. LB **$98,948**, est. $75,000. East Side Water Pump Station, FORT WORTH, TEX. City, City Hall, Fort Worth, Tex. Joe J. Rady, 511 Insurance Bldg., Fort Worth, Tex., engr. Bids Jan. 29.

R. J. Putney, 1503 Hadley St., Houston, Tex. CA **$132,500**, sanitary sewer collection lines; storm sewers, near HOUSTON, TEX. Robert P. Puig & Assocs., 3829 Villanova St., Houston, Tex. CD 11/3.

Arrington-Bradley Bldg. Co., Inc., 6801 Telephone Rd., Houston, Tex., CA **$137,455**, storm and sanitary sewers, HOUSTON, TEX. Glenbrook Development Co., 7445 Park Place Blvd., Houston, Tex. CD 12/22.

Arrington-Bradley Bldg. Co., Inc., 6801 Telephone Rd., Houston, Tex., CA **$74,405**, asphalt paved streets, curb and gutter, HOUSTON, TEX. Glenbrook Development Co., 7445 Park Place Blvd., Houston, Tex. CD 12/22.

E. J. Putney, 1503 Hadley St., Houston, Tex. Own Forces. **$70,000**, bldg. area earthwork, grading, HOUSTON, TEX. Robert P. Puig & Assocs., 3829 Villanova St., Houston, Tex.

Harris Co., Court House, Houston, Tex. Own Forces. public parks and playgrounds imprvs. and expansion. **$75,000**, Precinct No. 1; **$115,000**, Precinct No. 2; **$90,000**, Precinct No. 3; **$100,000**, Precinct No. 4. HOUSTON, TEX. Grand total $380,000. L. Fugate, Houston, Tex., co. engr. CD 11/7/52.

Bellaire Lumber Co., 7903 S. Flores St., San Antonio, Tex. Own Forces. **$71,336**, asph. paved streets, curbs and gutters, south of loop 13, between Perrin-Beitel Rd. and Salado Creek, SAN ANTONIO, TEX. CD 11/26.

Bellaire Lumber Co., 7903 S. Flores St., San Antonio, Tex. Own Forces. **$139,500**, sanitary sewers, storm sewers and some open drainage, south of Loop 13, between Perrin-Beitel Rd. and Salado Creek, SAN ANTONIO, TEX. CD 11/26.

W. R. Grun Constr. Co., 1912 Culebra Ave., San Antonio, CA **$400,000**, Second Sect., asph. paving some West Side Streets, SAN ANTONIO, TEX. City, City Hall, Military Plaza, San Antonio, Tex. CD 9/19/52.

† **Farnsworth & Chambers, Inc.**, Box 74, Houston, Tex. CA **$871,524**, est. $400,000-$875,000, Carlsbad fuel Terminal, incl. railway spur; 280,000 gal. water storage tank, underground utilities, Inv. No. ENG-29-005-55-49, CARLSBAD, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Jan. 27. CD 1/19.

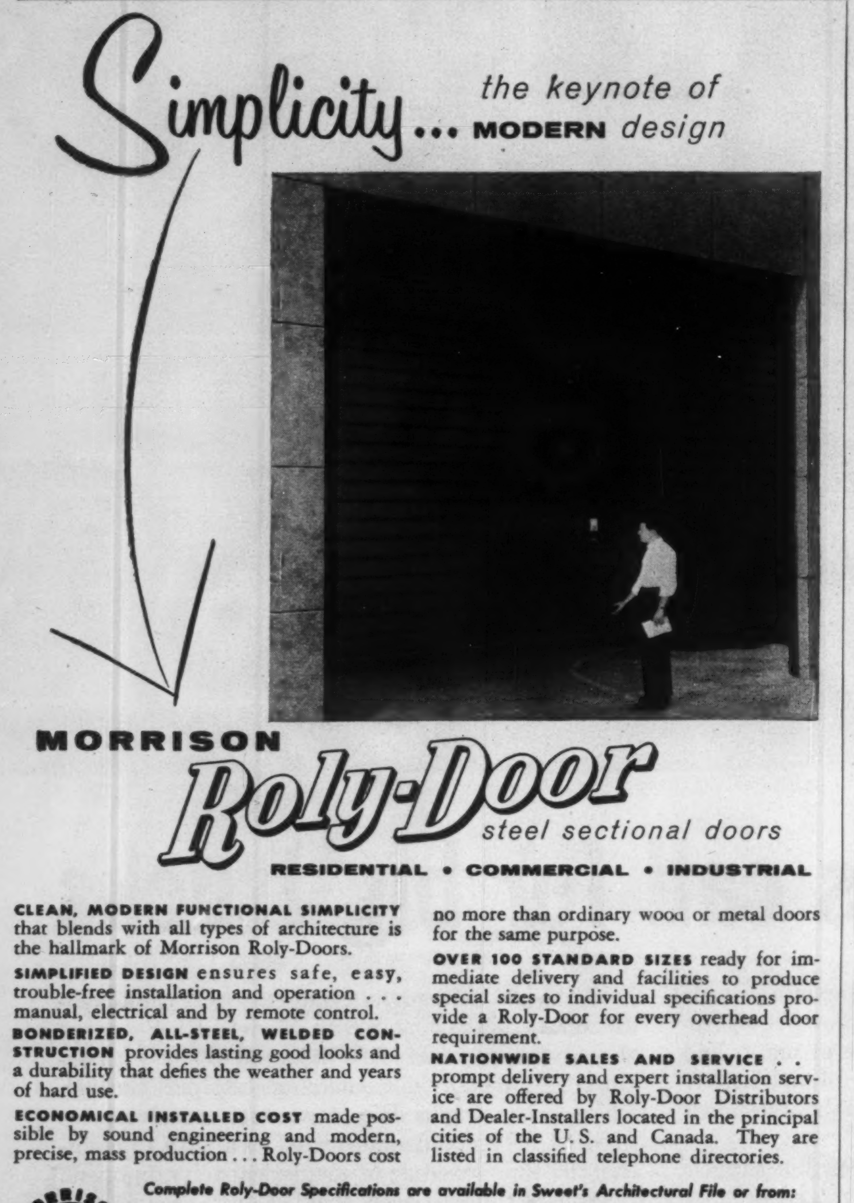
BUILDINGS

LOW BIDS AND CONTRACTS

Sheehy Constr. Co., 1552 W. Larpenteur Ave., St. Paul, Minn. CA **$515,000.** general contract MUNICIPAL BLDG., ANOKA, MINN. City, C. R. Johnson, mgr. and clk., Anoka, Minn. CD 1/12, under LB.

Swan Constr. Co., 8130 Valcour St., Affton 23, Mo. Est. **$350,000.** brick, steel, concrete SUPERMARKET, Grand Blvd. and Keokuk St., ST. LOUIS, MO. Chambers Motor Co., Inc., 3863 S. Grand Blvd., St. Louis, Mo. Gerhardt & Kramer Assoc., 9640 Clayton Rd., Ladue 24, Mo., archts. Kroger Co., 1311 S. 39 St., St. Louis 10, Mo., lessee. CD 6/11/54, under lessee, as owner.

(Continued on page 194)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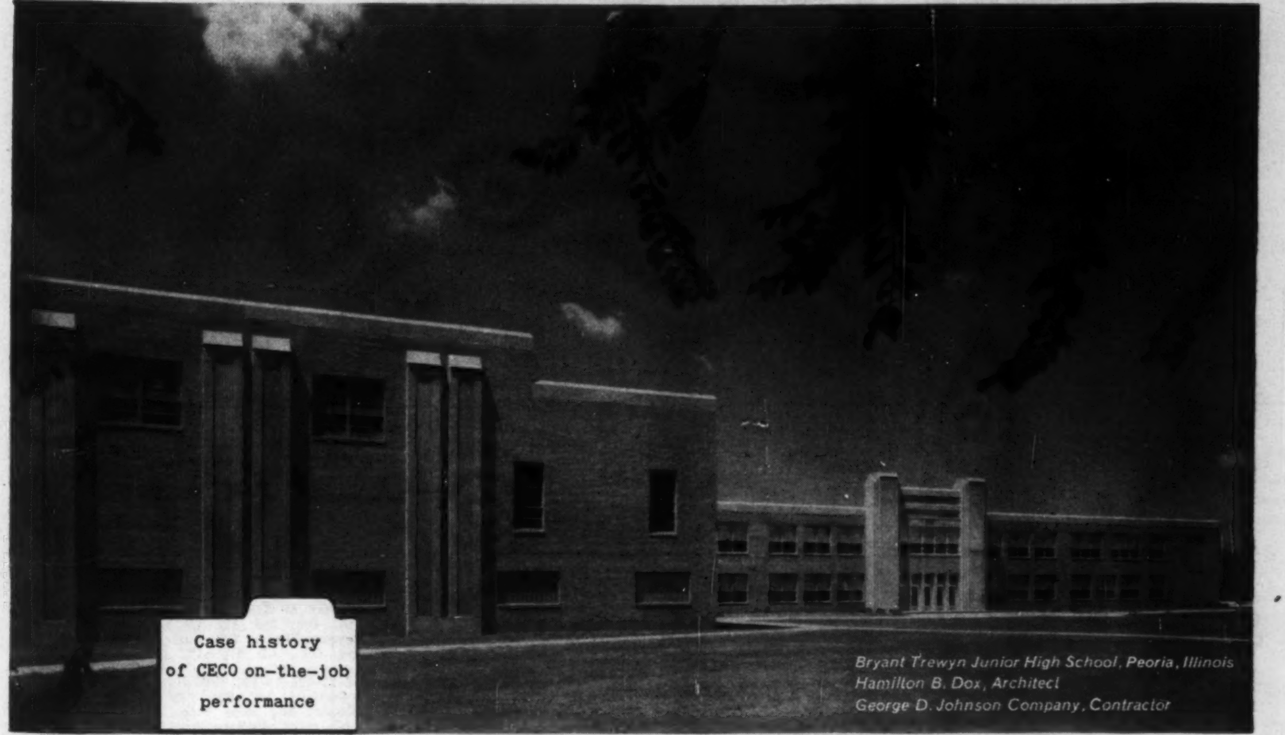
Also manufacturers of MOR-SUN WARM AIR FURNACES and MORRISON SERVICE BODIES
In Canada, Roly-Door Distributors, Ltd., 1330 Bloor Street W., Toronto 4, Ont.



Bryant Trewyn Junior High School, Peoria, Illinois
Hamilton B. Dox, Architect
George D. Johnson Company, Contractor

problem: meet a school building budget

solution: Ceco products...
saved 30% in concrete
saved 30% in deadload
saved 30% in roof costs

When a school building budget demands costs be cut to the bone, savings must be made from the ground up. And that is what Architect Hamilton B. Dox did with the Bryant Trewyn School. First there was the matter of basic structural methods. The architect and contractor brought Ceco into the planning—and together worked out the most efficient ways to frame the floors and roofs.

Ceco Steel Joists, chosen for classroom areas . . . saved 30% in concrete compared to heavy concrete framing—saved 30% in deadload—saved two months' erection time.

Ceco-Meyer Concrete Joist Construction, selected for the gymnasium area—provided rigidity—fire safety—speed—efficient design to reduce deadload . . . offered equally important savings. Then decking got the critical eye. When precast concrete design was compared with Ceco Steel Roof Deck, a saving of 30% in cost was chalked up for the Ceco method. Standard Ceco Architectural Projected Windows were chosen to eliminate the extra cost of special fabricating. Ceco Service met the construction schedule to the day—another example of saving through planning. CECO STEEL

CECO PRODUCTS USED

- Open-Web Steel Joists
- Steel Roof Deck
- Reinforcing Bars and Welded Wire Fabric
- Meyer Steelform Service
- Steel Architectural Projected Windows
- Metal Lathing Products

In construction products
CECO ENGINEERING
makes the big difference

CECO STEEL PRODUCTS CORPORATION
Offices, warehouses and fabricating plants in principal cities
General Offices, 5601 W. 26th Street, Chicago 50, Illinois

(Continued from page 192)

Hillin & Samanic, Box 11188, Fort Worth, Tex., LB **$333,000,** CHURCH and SUNDAY SCHOOL BLDG., ARLINGTON, TEX. First Presbyterian Church Congregation, Arlington, Tex. Broad & Nelson, 918 Reserve Loan Life Bldg., Dallas, Tex., archts. Bids Dec. 30.

Knowlton Constr. Co., 510 Gibraltar Life Bldg., Dallas Tex., LB **$393,400.** St. Monica Parish SCHOOL, CHURCH, DALLAS, TEX. Roman Catholic Diocese of Dallas and Fort Worth, 2122 Kidwell St., Dallas, Tex. Bennett & Crittenden, 2814 Fairmount St., Dallas, Tex., archts. Mullen & Powell, 701 Reserve Loan Life Bldg. and Blum & Guerrero, 4930 Maple St., Dallas, Tex. engrs. Bids Jan. 27. CD 12/21.

Powers Constr. Co., 3829 Villanova St., Houston, Tex. Own Forces. **$364,415,** 33 DWELLINGS, HOUSTON, TEX. CD 12/9.

Krumnow Constr. Co., 3929 Villanova St., Houston, Tex. Owner Builds. **$355,150,** 13 DWELLINGS, near HOUSTON, TEX. CD 11/22.

Lewis O. Tyra, c/o Tyra Lumber Co., 3519 Lawndale St., Houston, Tex. Own Forces. **$704,500,** Group "A" 31 DWELLINGS: Group "D" 39 DWELLINGS, LAMARQUE-TEXAS CITY, TEX. CD 11/17.

I. S. Fonville, 8231 San Fernando Hy., Dallas, Tex. Owner Builds. **$677,685** (C) 28 DWELLINGS (D) 25 DWELLINGS, MESQUITE, TEX. CD 12/1.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Wash., Everett**—RUNWAY, etc.—BA 2/24—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, resurf. runway and extending taxiway at Paine Air Force Base, Inv. 55 106. Revised date. CD 1/26.

† **Wash., Tacoma**—CREW—BA 2/25—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, 2 story, 42x142 ft., rein. con. readiness crew bldg., McChord Air Force base, ENG-4-5-108-55-131.

† **Wash., Tacoma**—PARACHUTE, etc.—BA 2/25—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, 6,022 sq. ft. rein. con. parachute and dinghy repair shop, McChord Air Force Base, ENG-45-108-55-132.

† **Washington**—SWITCHING STATION—BA 3/1—Bonneville Power Admin., 1001 N.E. Lloyd Blvd., Portland, Ore., East Arlington Switching Station addn. of U. S. Navy, Inc. 7556, Snohomish Co. Plans deporit $25. L. C. Stewart, 1001 N.E. Lloyd Blvd., Portland, Ore., engr. CD 2/5/51.

† **Calif., El Centro**—BA 3/3—Dist. P. Wks. Officer, Eleventh Naval Dist., San Diego, rehabilitation fire alarm sys., Naval Air Station, Spec. 45826. CD 10/22.

† **Calif., El Toro**—PAVEMENT REPAIRS—BA 3/3—Dist. P. Wks. Officer, Eleventh Naval Dist., San Diego, pavement repairs Marine Corp Air Facility, Spec. 45818. CD 10/22.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **McCollum Rock Co.,** 44918 N. Elm Ave., Lancaster Ave., Calif., LB, **$46,421,** installing addnl. pumping units in Pumping Plants 1, 2 and 3 of Wellton-Mohawk Div., Spec. D.C. 4228, ARIZONA, Bureau Reclamation, Dpt. Interior, Yuma, Ariz. Bids Jan. 11. CD 1/4.

† **T & T Engineering Co.,** 1275 E. 2nd St., Reno, Nev. CA **$75,363,** officers' club, Stead Air Force Base, RENO, NEV. U. S. Eng., 180 New Montgomery St., San Francisco 5, Calif.

WASHINGTON—State Hy. Comn., Olympia

N. Fiorito Co., 844 W. 48 St., Seattle, Wash., LB, **$422,114.** rein.-con. slab bridge and through steel truss bridge with rein.-con. T-beam approaches with clearing, grading, draining, surf., plant mix-type F paving 1.041 mi. Secondary State Hy. 9-C Humptulips River, F.A.S. S 0335 (5), Gray Harbor Co. Bids Feb. 1. CD 1/20.

▲ **WASHINGTON**—State Hy. Comn., Olympia,

L. Dockson Co., 3115 S. Pine St., Tacoma, Wash., LB, **$144,744,** surf; b. conc. paving 0.951 mi. Milwaukee Way Exten., Tacoma, F.A.P. U-4601 (1), Pierce Co.;

Scarsella Brothers, 2207 S. 146 St., Seattle, Wash., LB, **$378,693,** clearing, draining, grading 5.712 mi. Primary State Hy. 1, Ferndale to Bellingham F.A.P. BF-001-5 (7), Whatcom Co.;

E. C. Hall Co., F. H. Slate Co. & Oregon Ltd., 12012 S.W. Barbur Blvd., Portland, Ore., LB, **$524,648,** cement treated base, b. conc. 2.553 mi. Primary State Hy. 12, Mountain westerly, F.A.P.F 004-2 (6), Wahkiakum Co. Bids Feb. 1. CD 1/20.

† **Butler Constr. & Eng. Co.,** 3419 13 Ave. S.W., Seattle, Wash., LB, **$269,000.** reconstr. conveyor galley at Pier 25, Hanford St. Terminal, SEATTLE, WASH. Port of Seattle, Bell St. Terminal, Seattle 1, Wash. Bids Jan. 31. CD 1/20.

† **Westinghouse Electric Corp.,** U. S. Natl. Bank Bldg., Portland, Ore., LB **$79,615,** two sub-stations and three control centers, The Dalles Dam, Wasco Co., CIVENG-35-026-55-101, OREGON U. S. Eng., Pittock Block, Portland, Ore. Bids Feb. 1. CD 12/7.

† **Tyee Constr. Co.,** Hoge Bldg., Seattle ,Wash., LB **$797,162,** const. McNary Powerhouse-Switchyard No. 5. 230-kv and McNary-Maupin No. 2, 287-kv lines, 105.7 mi. Umatilla, Morrow, Gilliam, Sherman and Wasco Counties, Inv. 7536, OREGON. Bonneville Power Admin., 1001 N.E. Lloyd Blvd., Portland, Ore. Bids Feb. 1. CD 1/12.

BUILDINGS

LOW BIDS AND CONTRACTS

Waldo S. Hardie & Son, 191 Park Ave., Eugene, Ore., LB **$412,156,** CLUB BLDG., EUGENE, ORE. Young Mens Christian Assn. and Young Womens Christian Assn., Eugene, Ore. Bids Jan. 28. CD 1/11.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

Que., Seven Islands—AIRPORT TERMINAL, etc.—BA 2/28—Dpt. Transport, Hunter Bldg., Ottawa, Ont. airport terminal and control tower, Seven Islands Airport. $100,000. CD 4/21.

SOON LETS CONTRACT—HEAVY CONSTRUCTION

Ont., Beaverton—CAMP—The Downtown Church Workers Assoc. of Church of England, 65 Church St., Toronto, soon lets contract camp buildings at Mooreland Camp, Lake Simcoe. $90,000. Molesworth, Seacord & Savage, 18 Toronto St., Toronto, archts.

ALASKA

BIDS ASKED—HEAVY CONSTRUCTION

† **ALASKA**—BA 3/1—Alaska Road Comn., Dpt. Interior, Box 1961, Juneau,

364 ft. seven span I-beam bridge on steel pile substructure across MacLaren River at Mile 41 on Denali Hy. and 60-ft. I-beam bridge over Rock Creek. Plans deposit $10.

▲† **Alaska, Fort Richardson**—HARDSTANDS, PARKING AREAS—BA 3/3—U. S. Eng., Anchorage, const. hardstands, parking areas, Inv. 55-35. $1,000,000. CD 11/25/52, under Public Buildings.

BIDS ASKED—BUILDINGS

† **Alaska, Cordova**—POWER PLANT, etc.—BA 3/1—U. S. Eng., Anchorage, 20x34 ft. steel frame ACS transmitter and power plant bldg., Inv. 55-56. Plans deposit $15. CD 4/13/50.

BUILDINGS

LOW BIDS AND CONTRACTS

† **J. B. Warrack Co.,** 400 2 Ave. W., Seattle, Wash. CA **$588,000.** Pioneers HOME, Proj. 50-A-175, SITKA, ALASKA. Alaska P. Wks., Dpt. Interior, 123 3 St., Juneau, Alaska. Bids Jan. 12. CD 1/20, under LB.

U. S. POSSESSIONS

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Louis R. Sommer,** P. O. Box 3010,, Balboa, Canal Zone. LB **$815,213,** site preparation, constr. sub-station, install all equipment and accessories, other related work at Mt. Hope, CANAL ZONE. Panama Canal Co., Canal Zone. Bids Jan. 13. CD 11/18.

(Continued on page 198)

Volute design lowers cost of centrifugal pump care
New Principle Simplifies Self-Priming Centrifugal Pumps
New Line of Contractors' Pumps Designed for Rugged Service
"Humdinger" of a Pump Has Many New Advantages
Carter Centrifugal Pump Simpler, More Powerful
Simple Self-Priming Pump Features Less Parts
Still the biggest pump news in years
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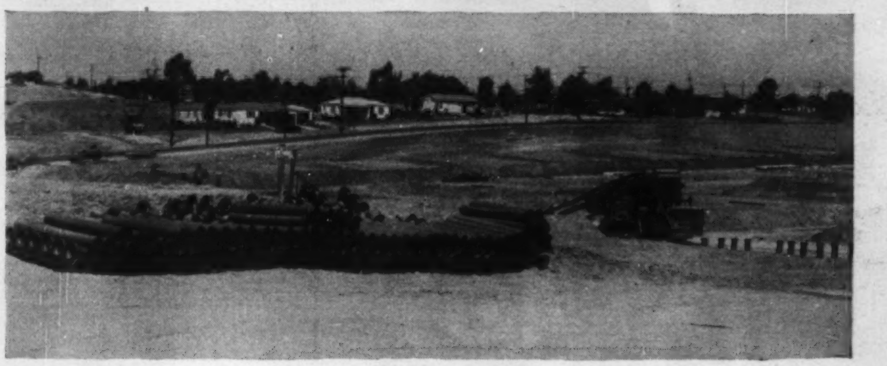
Years ahead in design and performance, these remarkable new self-priming centrifugals are made-to-order for fast, troublefree pumping on even the toughest dirty-water jobs.

Complete Range of Sizes:
1½" — 5500 GPH to 8" — 125,000 GPH

RALPH B. CARTER COMPANY
203 ATLANTIC STREET, HACKENSACK, NEW JERSEY

FOR *Big* HOUSING PROJECTS

IT'S CLAY PIPE ...by the MILE!



More Than 100 Miles of Clay Pipe Go Into 9,000-Unit Housing Project at San Diego

An estimated 630,000 feet of Vitrified Clay Pipe has been installed in San Diego's city-wide defense housing project . . . constructed under Title IX of the Federal Defense Housing Program. The 9,000-unit rental project cost approximately $60 million and is operated under private management.

Yes, Clay Pipe is being used literally *by hundreds of miles* in big housing projects all over the country. It's the *only* pipe that's absolutely safe against all the common causes of sewer pipe failure. Clay Pipe can't rust or corrode. It's completely unaffected by the acid gases that sewage waste generates. Hot detergent solutions can't cause it to turn soft or spongy. And for the maintenance-conscious builders of rental property, Clay Pipe is a "must," because it's the only pipe that is *guaranteed for 50 years.* Every section of Vitrified Clay Pipe has a built-in future of trouble-free performance. The next time you plan or install new sewerage, insist on Vitrified Clay Pipe. *It never wears out.*

NATIONAL CLAY PIPE MANUFACTURERS, INC.
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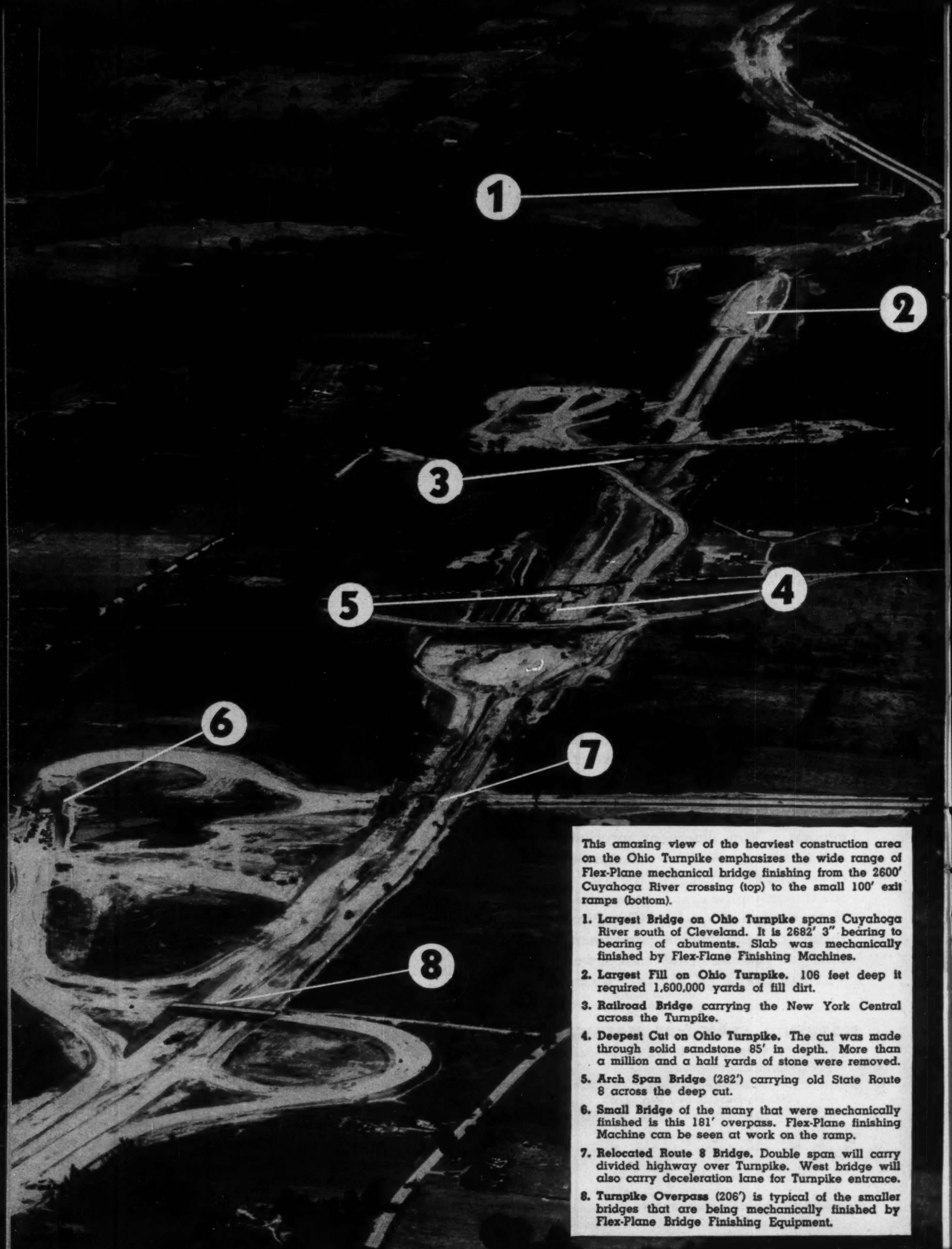
Vitrified
CLAY
CLAY PIPE NEVER WEARS OUT!
PIPE

C-155-2



This amazing view of the heaviest construction area on the Ohio Turnpike emphasizes the wide range of Flex-Plane mechanical bridge finishing from the 2600′ Cuyahoga River crossing (top) to the small 100′ exit ramps (bottom).

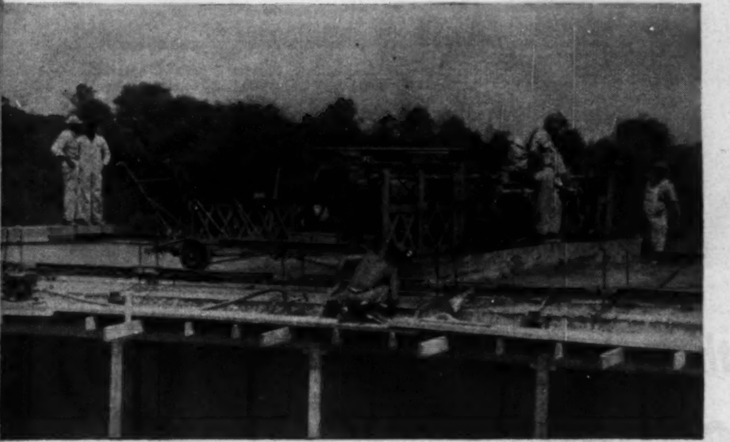
1. **Largest Bridge on Ohio Turnpike** spans Cuyahoga River south of Cleveland. It is 2682′ 3″ bearing to bearing of abutments. Slab was mechanically finished by Flex-Plane Finishing Machines.
2. **Largest Fill on Ohio Turnpike.** 106 feet deep it required 1,600,000 yards of fill dirt.
3. **Railroad Bridge** carrying the New York Central across the Turnpike.
4. **Deepest Cut on Ohio Turnpike.** The cut was made through solid sandstone 85′ in depth. More than a million and a half yards of stone were removed.
5. **Arch Span Bridge** (282′) carrying old State Route 8 across the deep cut.
6. **Small Bridge** of the many that were mechanically finished is this 181′ overpass. Flex-Plane finishing Machine can be seen at work on the ramp.
7. **Relocated Route 8 Bridge.** Double span will carry divided highway over Turnpike. West bridge will also carry deceleration lane for Turnpike entrance.
8. **Turnpike Overpass** (206′) is typical of the smaller bridges that are being mechanically finished by Flex-Plane Bridge Finishing Equipment.

The Machine that couldn't be built • Was!

MECHANICAL BRIDGE SLAB FINISHING ON OHIO TURNPIKE PAYS DIVIDENDS

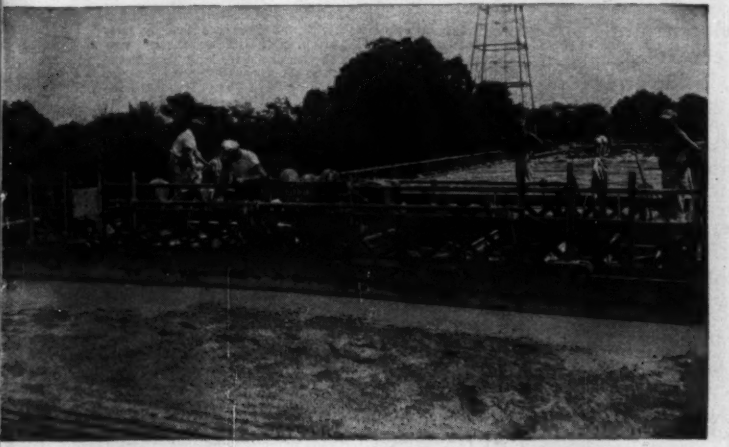
One construction firm, awarded a contract for building a piece of the Ohio Turnpike, heatedly questioned the ability of machine manufacturers to build a machine that was practical for finishing bridge slab according to the terms of the contract.

Some machine manufacturers themselves were doubtful. However, the Flexible Road Joint Machine Co., a recognized leader in the development of machinery for concrete finishing (Triborough Bridge — Pennsylvania Turnpike — etc.), set its engineers to work adapting its already successful bridge finishing machine to Turnpike specifications. The pictures below attest to the success. Not only are all the major and most of the minor bridges on the Turnpike being machine finished, but many of the secondary road over passes, where a concrete base will be topped with asphalt, are being constructed in this manner. Initial reports are tremendous. Greater uniformity, exceptional speed, beautiful riding quality, and, best of all, much less expensive.

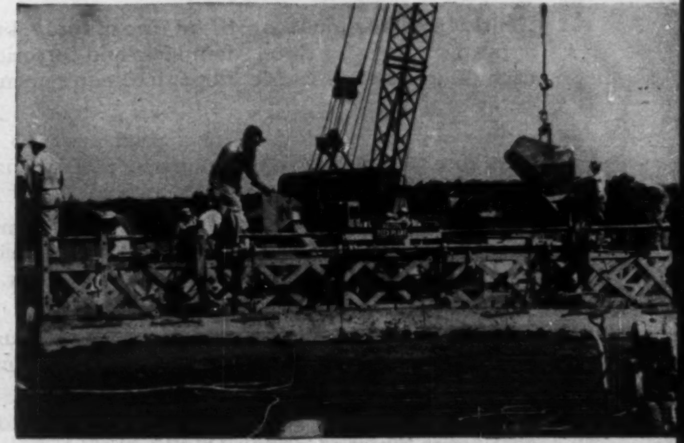


CUYAHOGA RIVER BRIDGES—All major stream crossings on the Ohio Turnpike are of dual construction. Actually two bridges—one for each direction of traffic. The Cuyahoga crossing is the longest—2682 feet. They were completely machine finished with two Flex-Plane Portable Bridge and Elevated Highway Finishing Machines. Note pneumatic rubber tired wheels in frame of machine. They are hydraulically dropped and machine becomes a trailer—easily and quickly towed anywhere along the job.

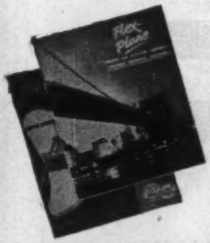
SANDUSKY RIVER BRIDGES—Crossing the Sandusky River near Fremont, Ohio, this pair of bridges is 915 feet in length. Flex-Plane Bridge and Elevated Highway Finishing Machine was used on these bridges. Actually only one operator is required to run finisher.
Note how concrete rolls in front of screed. It is not scraped or pushed. Machine leaves an extra smooth slab behind that requires a minimum of hand labor. Men in the foreground are tamping concrete through mesh.



MAUMEE RIVER BRIDGES—Note second bridge in left background. Flex-Plane Standard machine used here easily keeps pace while making a double run over slab surface. Although Turnpike bridges are standard width (30 feet) Flex-Plane Machine is telescopic and can be made to span extra-wide or extra-narrow slabs.



SECONDARY BRIDGES—Many construction firms, having experienced the ease an economy of machine finishing of bridges and elevated roadways, found they coul effect savings even on the smaller ramp bridges at Turnpike entries and secondar roads. Above Flex-Plane machine is finishing overpass that is but 206 feet i length. Same machine effected savings on a 181 foot ramp in same area.



Flex-Plane Finishing Machines have played roles in the finishing of roadways and bridges on the large concrete highway projects of the past decade. Flex-Plane engineers are experts in designing equipment for modern highway finishing. Why not bring yourself up-to-date by getting your copies of Bulletins N-14 (Bridge Finishing) and P-111 (Highway Finishing).

THE FLEXIBLE ROAD JOINT MACHINE CO.
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HYDRALT Protective Coatings are unique mineral colloid asphalt emulsions which provide a durable, thick film *reinforced within itself*. Will not sag, flow or crack. Cold-applied over metal, masonry and insulation materials.

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FLINTKOTE

(Continued from page 194)

Proposed Projects

WATER SUPPLY

▲ **Okla., Altus**—City, water supply. $1,250,000. V. V. Long & Co., Colcord Bldg., Oklahoma City, consult. engrs. CD 7/11/51.

▲ **Tex., Amarillo**—City, H. R. Smith, water supt., City Hall, one main water transmission line, $1,300,000; water booster station, $500,000; drilling, casing, developing unit of water supply wells in Dallam Co., $1,000,000; drilling, casing, developing unit of water supply wells in Carson Co., $1,000,000; drilling, casing, developing unit of water supply wells in Harley Co., $1,000,000; water distr. lines, $750,000; water storage, elevated and ground, $450,000. Freese & Nichols, 407 Danciger Bldg., Fort Worth, consult. engrs.

Tex., Fort Worth—City, W. O. Jones, mgr., City Hall, Holly Plant, incl. office, warehouse, meter shops and repair shops, storage yards. $500,000. Freese & Nichols, 407 Danciger Bldg., consult. engrs. CD 10/2/52.

SEWERS, WASTE DISPOSAL

Calif., San Rafael—Sanitary District No. 1 of Marin Co., San Rafael, defeated $980,000 bonds, sewage sys. CD 1/4.

Calif., Ukiah—City, S. E. Mitchell, clk., City Hall, sewage treatment plant, imprv. sewer lines inside city and outfall sewer to handle entire sewage load of the valley, $730,400. Douglas Cruickshank, City Hall, city engr. Brown & Caldwell, 66 Mint St., San Francisco, consult. engrs.

▲ **Ia., Fort Madison**—City, City Hall, sewage plant, $1,145,000. Stanley Eng. Co., Muscatine, consult. engr.

Minn., Brooklyn Center—Village, P. H. Weekly, clk., sanitary sewers, $984,000, Minder Eng. Co., 6418 56 Ave. N., Minneapolis, consult. engr.

O., Sidney—City, sewage disposal plant. $655,000. A. G. Wyatt & Assocs., 406 Oak St., Columbus, consult. engrs. CD 12/10/52.

Ont., Sarnia—City, Sarnia, Davis St. trunk sewer from East St. to St. Clair River. $628,000. T. H. Dobbin, c/o owner, staff engr. CD 3/13/52.

BRIDGES

▲ **WASHINGTON**—State Hy. Comn., Olympia,

Pierce Co.—bridge over South Prairie Creek on Hy. 5-E, Puyallup to Buckley, $188,000.

reconstr. east approach to 11 St. Bridge in Tacoma, $870,000.

bridge over Dry Gulch between Brown's and Dash Points. W. A. Bugge, state hy. dir.

▲ **Que., Montreal**—Canadian National Rys., R. O. Stewart, ch. engr., 360 McGill St., altering Victoria Bridge in connection with St. Lawrence Seaway, new road on east side of bridge; lift span over new channel at St. Lambert end of bridge plus new motor traffic bridge over channel when lift span is up, $4,000,000. Dr. P. L. Pratley, 1117 St. Catherine St. W., consult engr., A. G. Murphy, ch. engr. of St. Lawrence Seaway. Auth., 685 Cathcart St., Montreal, Que. CD 7/30/43.

EARTHWORK, WATERWAYS

▲ **Washington — Chelan County Public Utility Dist.**, Wenatchee, hydro dam across Columbia River at Rocky Beach, Wenatchee. $200,000,000. Stone & Webster Eng. Corp., 49 Federal St., Boston, Mass., consult. engrs. CD 12/31/53.

AIRPORTS

▲ **N. Y., Idlewild**—AIR CARGO BLDGS., etc.—**Port of** New York Auth., 111 Eighth Ave., New York, Zone 11, 2 new air cargo bldgs., $2,600,000; 3 new taxiways, $1,750,000; 1 story general purpose bldg. $144,000, New York International Airport. CD 1/18/54.

▲† **Okla., Oklahoma City**—WAREHOUSES—U. S. Eng., Box 61, Tulsa, Zone 2, two warehouses, total 640,000 sq. ft. Tinker Field. $4,000,000.

Ont., London—RUNWAY, etc.—Dpt. Transport, Ottawa, 6,000 ft. runway for jet planes, high intensity runway lights, water supply line at air base, $700,000.

Que., Cartierville—RUNWAYS—Dpt. Transport, Ottawa, Ont., extending runways from 7,000 to 10,000 ft. at airport, Montee St. Laurent $400,000.

LATIN AMERICA

Mexico, Monterrey—State Govt., Palacio del Estado, Monterrey, plans WW. $700,000. CD 4/2/47.

PUBLIC BUILDINGS

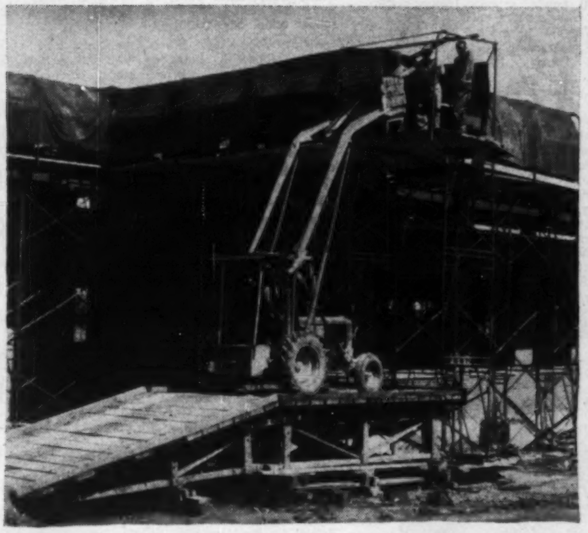
Calif., Castro Valley—SCHOOLS—Castro Valley Elementary School Dist., 6600 Christensen Lane, $500,000 bond election May 20, schools.

(Continued on page 200)

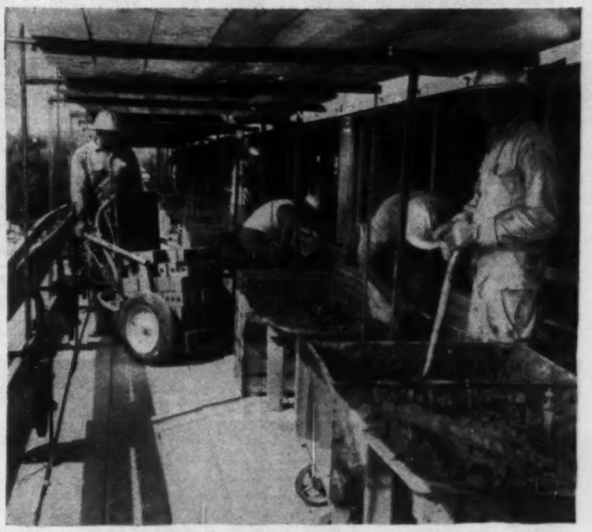
(Advertisement)

Scaffolding Methods . . .

by Patent Scaffolding Co.



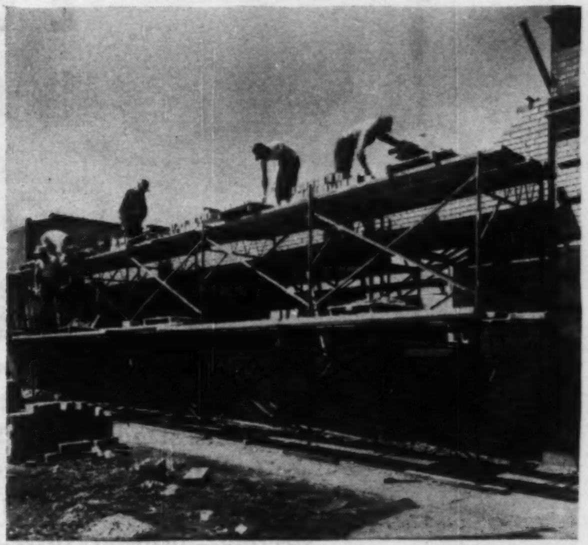
THE MECHANIZED WAY — Extra-wide "Trouble Saver" Sectional Scaffolding and a tractor with front-end loader and fork lift show how mechanization cuts masonry material handling costs on the Frontier School, Town of Hamburg, N. Y. Tractor lifts palletized brick up to scaffold where it is distributed to masons on brick buggies. Scaffold platform width is increased with 20-in. brackets to allow ample room for maneuvering brick and mortar buggies. 30-in. brackets on wall side give masons a clear working platform. Seigfried Construction Co., general contractor.



PLENTY OF ROOM—Brick and mortar buggies have no trouble maneuvering on this "Gold Medal"® Safety Suspended Scaffold in use on $1,500,000 Cedar Apartments Extension, Cleveland, by W. M. West & Son Co. Scaffolding drum mechanisms are set back from wall to give masons an unobstructed 20-in. platform. More masons and general contractors are taking advantage of mechanized handling because of the availability of specially-designed PS Scaffolding that withstands the extra loads and provides the extra space required for palletizing and mechanized handling of brick and mortar.

BRICK MASONRY
ALLEVA
CONSTRUCTION CORP.

THREE 'BARROWS WIDE—Three wheelbarrows, two of mortar and one of brick, go up at one time on this 65-ft. "Trouble Saver" Sectional Hoist Tower in use on new apartment building in Fort Lee, N. J. Tower is lightweight, yet has a load capacity of 4,000 lbs. It is quickly erected from just four component parts: one-piece base unit, prefabricated steel end frames, braces and girts. End frames are quickly locked together.



SMALL JOBS, TOO—"Trouble Saver"® Sectional Scaffolding can be used to advantage on any size masonry job. For instance, on this typical small job in Chicago, General Contractor C. A. Klooster uses 60 5-ft. high "Trouble Saver" frames to keep both men and materials in efficient working position. 20-in. sidewall brackets, normally on wall side for mason's platform, are used here on the outside to support platform for handing up masonry materials.

To help you solve any scaffolding problem, PS offers a complete nation-wide engineering service—available locally. See the Yellow Pages in your 'phone book for the nearest Patent Scaffolding office or representative handling "Gold Medal" Scaffolds.

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Branches in all principal cities

(Continued from page 198)

▲ **Calif., Concord** — SCHOOLS — Mount Diablo Unified School District, Concord, **$4,500,000** bond election Mar. 1, schools.

Calif., Corona—SCHOOLS—Corona Unified School Dist., Corona, **$560,000** bond election Feb. 11, schools. CD 5/28/53.

Calif., Fort Bragg—SCHOOLS—Fort Bragg Union High School District, Fort Bragg, **$625,000** bond election Mar. 1, addnl. schools.

Calif., Indio—SCHOOL—Indio School District, Indio, **$500,000** bond election Mar. 18, schools.

▲ **Calif., Orange** — SCHOOLS — Orange Unified School Dist., Orange, defeated **$1,100,000** bonds, schools. CD 10/28.

Calif., Oroville—SCHOOLS—Oroville Elementary School Dist., Oroville, **$330,000** bond election Mar. 31, school.

Calif., Walnut Creek—SCHOOLS—Walnut Creek School District, Walnut Creek, voted **$800,000** bonds, schools. CD 11/4.

Conn., New Canaan—SCHOOL—Town, Falls Village, plans by William J. Provoost, 421 Main St., Stamford, elementary school, Pease St. **$750,000.**

Conn., Windsor—SCHOOL—Town, P. Bldg. Comn., and Bd. Educ., Town Hall, plans by Warren H. Ashley, 967 Farmington Ave., West Hartford, 1 story elementary school, Clover St. **$600,000.** CD 11/23.

▲ **Ia., Fort Dodge**—SCHOOL IMPRVS.—Bd. Educ., Fort Dodge, voted **$2,150,000** bonds, schools imprvs. CD 1/28.

Mass., Amherst—DORMITORY—University of Mass., Alumni Assoc., Amherst, plans by Louis W. Ross, 131 State St., Boston, 3 story, bsmnt. Dormitory No. 14 addn. **$800,000.**

Mass., Randolph—SCHOOL—Town, Elementary School Bldg. Comn., plans by Coletti Bros., 687 Boylston St., Boston, elementary school, **$550,000.**

Mich., Houghton—CIVIL AND GEOLOGY—State, A. N. Languis, dir. State Bldg. Dpt., Lewis Cass Bldg., Lansing, civil and geology bldg., Michigan College of Mining and Technology, **$616,000.** CD 3/3/47.

Mo., Jefferson City—PARKING GARAGE—State c/o Gov. Phil M. Donnelly, State Capitol, plans by Marcel Boulicault, Ambassador Bldg., 411 N. 7 St., St. Louis, Zone 1, underground parking garage on state capitol grounds, **$900,000.** CD 1/4/51.

▲ **Mont., Billings** — SCHOOLS — Yellowstone County School Dist. 2, 3201 Fourth Ave. N., voted bonds Jan. 28, Junior High School, **$2,000,000,** Cushing & Terrell, 1333 N. 27 St., archts.; 1 story, brick elementary school, **$350,000,** Harry Loners, 418 N. 25 St., archt. CD 1/11.

Pa., Beaverdale—SCHOOL—Summerhill Twp. School Dist., Beaverdale, plans by Kring & Ross, 1534 Luzerne St. Ext., Johnstown, brick, block, steel grade school addn. **$560,000.**

Pa., Bridgeville—HIGH SCHOOL—School Dist. of Bridgeville, Bridgeville, plans by Warnick & Co., 106 E. Walnut St., Butler, brick, block, steel Junior-Senior High School. **$800,000.**

Pa., Coraopolis—HIGH SCHOOL—School Dist. of Coraopolis, State St., plans by Glenn Bickerstaff, 1311 Investment Bldg., Pittsburgh, 1 and 2 story, bsmnt., brick, block, steel Junior High School addn. **$700,000.**

R. I., Warwick—SCHOOL—City, School Dpt., City Hall, plans by MacConnell & Walker, 3308 Post Rd., elementary school. **$500,000.**

▲ **Tex., Beaumont**—SCHOOLS—South Park Independent School Dist., bond election Feb. 12, (white) Elementary School No. 1, **$425,000;** (white) Elementary School No. 2, **$550,000;** (negro) Elementary School No. 1, **$390,000;** (negro) Elementary School No. 2, **$485,000.** CD 7/6/51.

▲ **Tex., Corpus Christi**—HIGH SCHOOL—Corpus Christi Independent School Dist., 515 N. Carancahua St., plans by Smyth & Smyth, 1806 S. Almeda St., Mary E. Carroll High School. **$1,500,000.** CD 3/12.

Tex., Huntsville — GYMNASIUM-DORMITORY — Sam Houston State Teachers College, Huntsville, plans by Wirtz, Calhoun, Tungate & Jackson, 2506 Richton St., Houston, 3 story, 152 x 166 ft. rein.-con. combination gymnasium-dormitory, **$650,000.** CD 9/12/50.

Tex., Odessa—COLLEGE BLDGS.—Odessa Junior College Odessa, Junior College Bldgs. **$785,000.**

▲ **Tex., Sundeen**—SCHOOLS — Sundeen Independent School Dist., W. K. Fraser, supt., Sundeen, constr. group upper grade school classrooms, **$450,000;** group of lower grades school classrooms, **$550,000.**

▲ **Utah, Salt Lake City**—SCHOOLS—Bd. Educ., 440 East 1st South St., plans by Scott & Beecher, Cocly Bldg., Riley School, **$500,000;** plans by Ashton, Evans & Brazier, 24 S.W. Temple St., auditorium at Jorden High School, **$500,000.** CD 4/27.

▲ **Utah, Salt Lake City**—SCHOOL—Granite School Dist., 3212 S. State St., voted **$4,500,000** bonds school building program. CD 1/4.

▲ **Va., Blackburg**—INSTITUTE BUILDINGS, etc.—Virginia Polytechnic Institute, S. K. Cassell, bus. mgr.,
laboratory and classroom for chemical and aeronautical engineering, **$998,000.**
science bldg., physics, **$770,000.**
turkey research plant, **$300,000.**
central bio-chemical and bacteriological research laboratory, **$440,000.**
engineering laboratory, classroom and office bldg., for applied mechanics, civil engineering and administration offices, **$1,200,000.**
dairy barns and milk house addn. **$185,000.**
completion of animal and poultry disease research laboratory, **$83,000.**
McBryde Hall renovation, **$150,000.**
vocational education bldg., **$431,000.**
business administration bldg., **$793,000.**
Holden Hall addns., **$600,000.**
student dormitory units, six structures housing 1,700-students, **$3,628,280.**
student dining hall, **$528,000.**
laundry addn., **$250,000.**
heat and power plant addn., **$1,143,000.**
field house, **$2,200,000.**
Squires Hall addn., **$525,000.**
steam heat lines exten., **$294,050.**
tennis courts, **$65,000.**
storm drainage installations, **$150,000;** sanitary sewer mains, **$92,500.**
grounds developing, grading, seeding, walks, drives, etc., **$250,000.** CD 6/3/52.

Ont., London—NAVAL TRAINING—Defence Constr. Ltd., 56 Lyon St., Ottawa, Naval Training Bldg. to replace present H.MC.S. Prevost at Beecher St. and Thames River, **$500,000.**

▲ **Que., Quebec City**—IMMIGRATION—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., plans by Gaston Amyot, 2 Belvedere Ave., immigration bldg. at Anse au Foulon **$4,000,000.** Leblanc, Montpetit & Dorval, 604 John St., consult. engrs. CD 3/23.

▲ **Que., Three Rivers**—MENTAL HOSPITAL—Quebec Dpt. Health, Parliament Bldgs., Quebec City, plans by Denoncourt & Denoncourt, 1425 Notre Dame St., 1,200 to 1,500 bed mental hospital **$15,000,000.** CD 1/17.

COMMERCIAL BUILDINGS

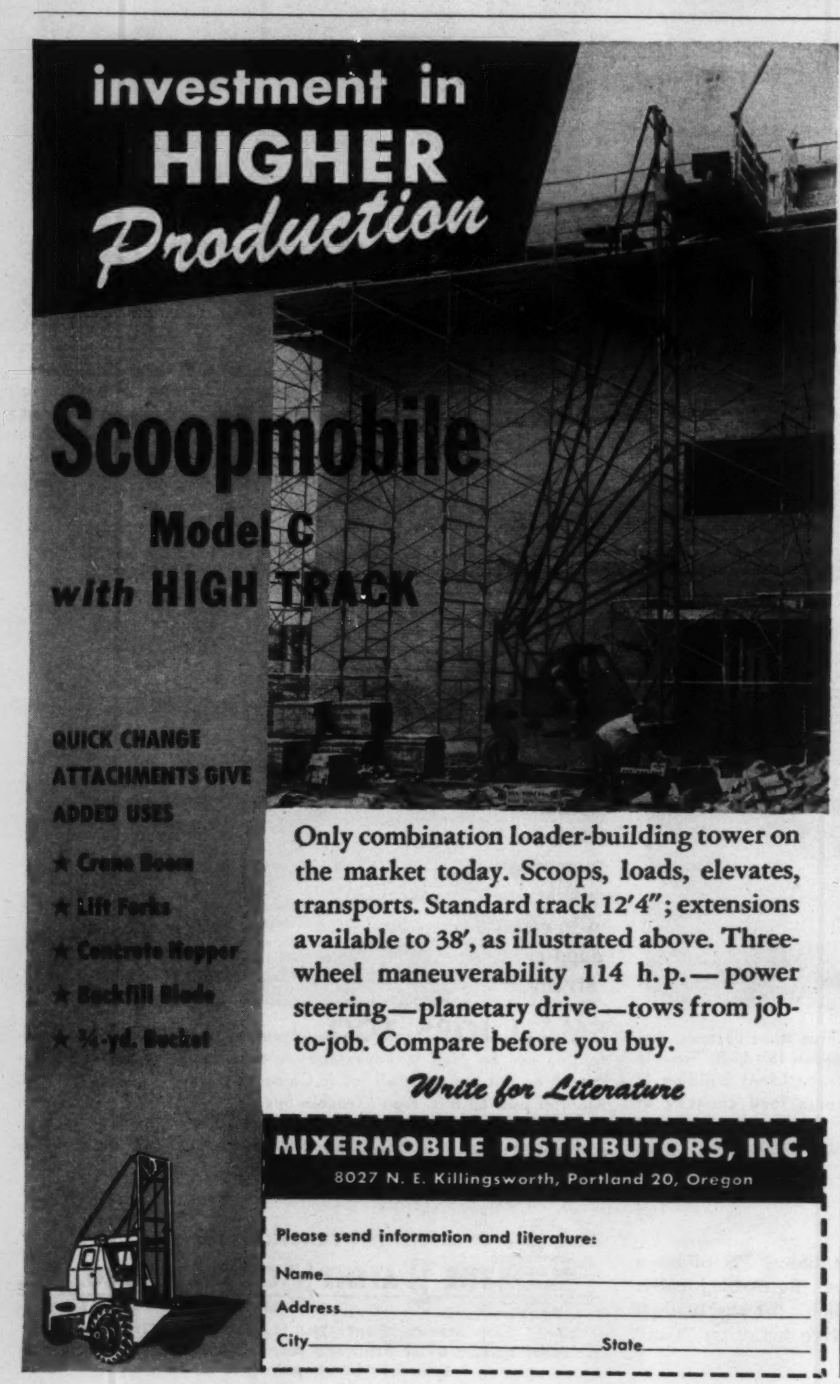
▲ **Ark., Little Rock**—SHOPPING CENTER—Fausett & Co., Gazette Bldg., plans by K. E. N. Cole, Jr., 5707½ Kavanaugh Blvd., 21-unit 70,000 sq. ft., shopping center, **$1,250,000.** Kenneth W. LeFever, 401 Victory St., consult. engr.

▲ **Ark., Little Rock**—HOMES—Fausett & Co., Gazette Bldg., plans by K. E. N. Cole, Jr., 5707½ Kavanaugh Blvd., 96-homes, College Terrace Addn., 25-acres, **$1,200,000.**

▲ **Ark., Little Rock**—SHOPPING CENTER—Paul H. Spikes & Co., 104 State St., plans by K. E. N. Cole, Jr., consult. archt., 5707½ Kavanaugh Blvd., 99,954 sq. ft. shopping center, 1,824 parking spaces, 72-unit motel, swimming pool and 102-seat restaurant, **$2,500,000.**

▲ **Calif., Concord** — SHOPPING CENTER, etc. — Ben Swig, Fairmont Hotel, San Francisco, shopping cen-

(Continued on page 202)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LIGHTWEIGHT INSULATING FIREPROOF CONCRETE ROOF DECK SPECIFICATION MANUAL—By Dale A. Lehr, 218 pp. Perlite Division, Great Lakes Carbon Corp., 612 So. Flower St., Los Angeles 17, Calif. Limited free distribution.

Building designers will find very useful this new manual on perlite concrete for roof decks, in which, for the first time is taken an authoritative and sound engineering approach to a subject of growing importance. The book contains numerous tables and diagrams of roof construction that simplify design. A looseleaf binder enables supplementary information to be added later, when available.

Perlite aggregate, formed by "popping" a siliceous volcanic rock at 1,500 F, weighs less than one-tenth as much as sand or gravel. It can be used alone as a non-structural insulation fill or mixed with portland cement and water to form a lightweight structural concrete of high insulative value. The book presents data for both types of application.

Design tables in the manual enable a designer to pick out the thickness of roof deck required for various mixes to obtain a desired overall insulation value. The compressive strength of the slab also is given, thus enabling the designer to check the thickness for load-carrying capacity.

The tables give coefficients of heat transfer (U-values) for slabs on permanent forms of various types, on metal lath and on paper-backed wire mesh. The effect of ceilings is taken into account. Accompanying drawings show details of the various types of construction.

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"Engineering News-Record" 6/29/54

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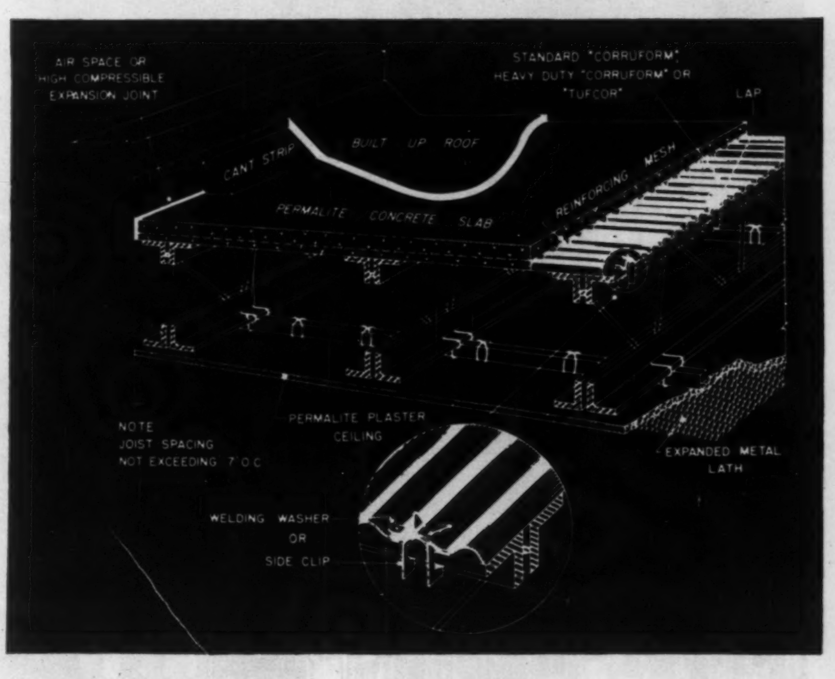

The big, new Permalite Roof Deck Manual gives you, for the first time, *complete, factual, reliable data* on the use of lightweight, insulating concrete in open-web roof deck construction. Leading architects and designers agree that this 220-page volume provides complete engineering information in easy-to-use form . . . all the different roof forms and types of suspended ceilings, with page after page of tables on slab thickness, weights, strengths and U-factors, already worked out for you to make specifying quick, easy and accurate. You can get this authoritative handbook, packed with usable, every-day working information, from the Permalite franchisee serving your area — for his name and address

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(Continued from page 200)

ter and residential area on North St. between Blenbrook and Arnold Hy. **$5,000,000.**

▲ **Calif., La Mirada**—DWELLINGS—Shaw Constr. Co., 650 S. Spring St., Los Angeles, plans by L. C. Major & Assocs., 11015 S. Paramount Blvd., Downey, 450 frame, stucco dwellings in Tract 2329, Orange Co. and Tract 15930, Los Angeles Co. **$4,000,000.**

Calif., Los Angeles—DWELLINGS—Community Builders, 4655 Radford St., North Hollywood, 67 frame, stucco dwellings, Hayness, Victory and Louise Sts. **$746,700.**

Calif., Los Angeles—DWELLINGS—Rosenberg & Young, 7345 Van Nuys Blvd., 73 frame, stucco dwellings, Beachy St. and other streets. **$730,000.**

Calif., Oakland—MEDICAL-DENTAL—Owner, c/o Albee Co., 2109 Bancroft St., San Leandro, plans by Geo. Stever, 220 Bancroft Way, San Leandro, medical-dental bldg., 29 and Summit Sts., **$700,000.**

Calif., Sacramento—MEDICAL ARTS—Mr. & Mrs. Jack Kaiser, and Mr. & Mrs. Sylvester Richards, c/o Jack Kaiser, 2255 Eighth Ave., medical arts bldg., 2720 Capitol Ave. **$750,000.**

Calif., San Francisco—HOSPITAL—St. Francis Hospital, Bush and Hyde Sts., plans by Frank W. Trabucco & Louis Hurlbut, 355 Stockton St., hospital modernization, **$550,000.** CD 10/12/51.

Calif., Santa Ana—DWELLINGS—Douglas Edwards, c/o L. C. Major & Assocs., archts., 11015 S. Paramount Blvd., Downey, 69 frame, stucco dwellings, Tract 2070. **$600,000.**

Colo., Brighton—SHOPPING CENTER—Perlmutter, Inc., 1944 Broadway, Denver, plans by Warren Flickinger, consult. engr. and archt., 401 Vallejo St., Denver, 1 and 2 story, part bsmnt. shopping center, **$500,000.**

Colo., Denver—HOTEL—Hampden Development Co., c/o T. A. Hutchinson, 3800 South Albion St., Denver, one and 2 story 253-room ranch type hotel, Hampden and Valley Hy. **$750,000.**

▲ **Conn., Bridgeport**—MEDICAL CENTER—Medical Center, Inc., Dr. M. David Deren, pres., c/o Toby Vece, archt., 9 Roger Williams Rd., co-operative medical center, Washington Ave., opposite West Ave. **$1,000,000.**

Conn., Noroton—SHOPPING CENTER—Noroton Heights Shopping Center, Inc., c/o Page & Franklin, 244 Post Rd. East, Darien, shopping center, north side of Glenbrook Rd. **$500,000.**

Del., Wilmington—CHURCH, etc.—St. Matthew's Roman Catholic Church, Curtis Ave. and Woodcrest, plans by J. George McDermott, 1307 Washington St., church, school alterations and rectory alterations, **$500,000.**

▲ **Ill., East St. Louis**—SHOPPING CENTER—Shop City, Inc., A. J. Molsky, chn. bd. 8300 Amherst Ave., University City, Mo., plans by Shapiro & Tisdale. 705 Chestnut St., St. Louis 1, Mo. development of shopping center on 100-acre tract in area bounded by St. Clair Ave. 43. State and 51 Sts., incl. 10 major bldgs., and parking area, **$6,000,000-$8,000,000.**

Ill., Zion—DEPARTMENT STORE—Kilbane Brothers, Inc., 1319 Genesee St., Waukegan, plans by Ekstrand, Schad & West, 1334 Grand St., Waukegan, department store, 5 and 10c store, variety store, 2650 Sheridan Rd. **$500,000.**

Ind., Indianapolis—LIBRARY—Butler University, Dr. M. O. Ross, pres., 49 and Sunset Sts., plans by McGuire & Shook, 1400-01 Fletcher Trust Bldg., library at college. **$500,000.**

▲ **Ky., Lexington**—SHOPPING CENTER—R. W. McIlvain, Clarence Lebus and J. S. Lanselll, c/o Scruggs & Hammond, landscape engrs., 837½ E. High St., shopping center parking facilities, 10 acres, **$1,500,000.**

▲ **Md., Bethesda** — HOSPITAL — Suburban . Hospital, Bethesda, plans by Faulkner, Kingsbury & Stenhouse, Ring Bldg., Wash., D. C., 4 story hospital wing expansion, **$1,200,000.**

Mo., Grandview—SHOPPING CENTER—Evelyn Lands Co., Jno Lund, realtor-sponsor, Independence, plans by Wm. F. Fullerton Jr., 15 W. 10 St., Kansas City, Mo., shopping center on 9 acre tract on west side hy., 57,500 sq. ft. retail sales area, parking accommodations, U. S. Hy. 71 between Goode and Thomas Aves. **$900,000.**

▲ **Mich., Lansing**—HOSPITAL—St. Lawrence Hospital, Bd. Trustees, 1210 W. Saginaw St., plans by Smith-Hinchman & Grylls, Inc., 800 Marquette Bldg., Detroit, 86,000 sq. ft. St. Lawrence Hospital addn. **$2,177,932.** CD 1/6.

▲ **Mo., St. Louis**—HOSPITAL—Alexian Brothers Hospital, Brother Jude Eckrich, rector, 3933 S. Broadway, Zone 18, plans by Maguolo & Quick, 4908 Delmar Blvd., Zone 8, addn., and modernization of present hospital bldgs. **$1,500,000.** CD 7/3/51.

▲ **Mo., St. Louis**—HOME—The Good Samaritan Home for the Aged, H. H. Gieselman, pres., 4500 Washington Ave., Zone 8, plans by Walter P. Manske, 9947 Riverview Dr., Zone 15, home for the aged, 5200 S. Broadway, **$1,000,000.** CD 11/16.

Mo., Valley Park—CHAPEL—Maryknoll Noviate, c/o Foreign Mission Sisters of St. Dominic, Vance Rd., Valley Park, plans by Leo A. Daley Co., Ambassador Bldg., 411 N. 7 St., St. Louis, Zone 2, chapel and 3 story dormitory, **$500,000.**

Neb., Fremont—ADMINISTRATION—Midland College, Fremont, plans by H. F. Turner, Fremont, administration bldg. **$500,000.** CD 1/12.

▲ **N. Y., Brooklyn**—SCHOOL, etc.—R. C. Parish of St. Thomas Aquinas, 1550 Henderickson St., plans by Robert J. Reiley, 45 W. 45 St., New York, Zone 19, 3 story parochial school and residence for brothers, 1992-2024 Flatbush Ave. **$1,000,000.** Severud-Elstad-Krueger, 415 Lexington Ave., New York, Zone 17, engrs. (**Correction**—archt.). CD 1/13.

▲ **N. Y., New York**—OFFICE—111 West 40th Street & General Realty & Utilities Corp., 285 Madison Ave., plans by Sydney Goldstone, 285 Madison Ave., and Kahn & Jacobs, 2 Park Ave., 30 story office, 11 W. 40 St. **$15,000,000.**

▲ **N. Y., New York**—AUDITORIUM, etc.—St. Luke's Hospital, 421 W. 113 St., plans by York & Sawyer, 101 Park Ave., Zone 17, auditorium addn., laboratories, clinics, etc., 1091 Amsterdam Ave. **$1,500,000.**

▲ **N. Y., New York**—HOSPITAL, etc.—Sisters of Misericorde, 531 E. 86 St., plans by York & Sawyer, 101 Park Ave., hospital, nursing school, shelter and convent, Misericordia Hospital, 233 St. and Bronx Blvd. **$7,500,000.**

▲ **N. Y., Rye**—OFFICE, etc.—Continental Baking Co., 630 Fifth Ave., New York, Zone 20, plans by Lathrop Douglass, 518 Fifth Ave., New York, Zone 18, 2 story office, 1 story laboratory, 18 acre tract between Theall Rd. and Theodore Fremd Ave. **$1,000,000.** CD 1/19.

▲ **Okla., Tulsa**—RESIDENTIAL—Otis E. Nidifer, Kennedy Bldg., Wedgewood residential development, S. E. 21 and Yale Ave., **$1,500,000.**

▲ **Pa., Phila.**—APARTMENT—E. J. Frankel, 2201 Pennsylvania Ave., plans by Boak & Raad, 175 Fifth Ave., New York, N. Y., apartment bldg., garage, 19th and Locust Sts. **$3,000,000.** CD 12/1.

▲ **Pa., Phila.**—CLASSROOM—Temple University, Broad St. and Montgomery Ave., plans by Nolen & Swinburne, 1649 N. Broad St., classroom bldg., Montgomery Ave., Park Ave. to 13 St. **$1,250,000.** CD 10/20.

▲ **Tex., Corpus Christi**—OFFICE—Sam E. Wilson Jr., Wilson Bldg., 25 story office, Mestina St. and North Upper Broadway, **$5,500,000.**

▲ **Tex., Houston**—APARTMENT—Syndicate, c/o Joe L. Albritton, trustee, Sterling Bldg., plans by John Linn Scott & Assocs., 406 W. 17 St., Austin, apartment. **$3,000,000.** CD 1/6.

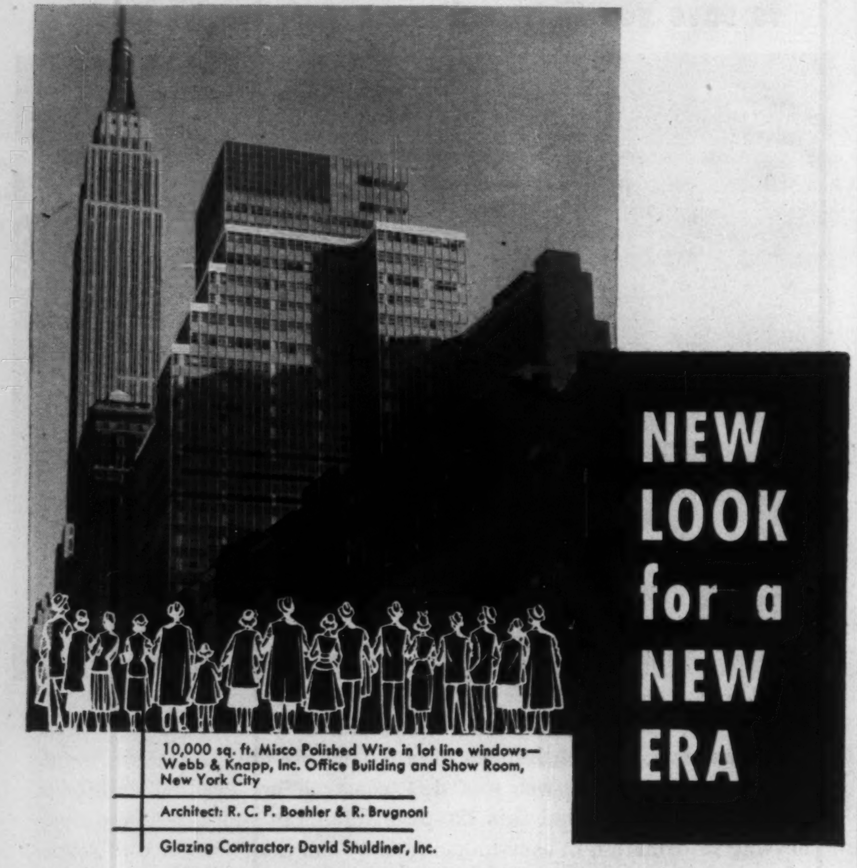
▲ **Wash., Bellevue**—DEPARTMENT STORE—Marshall Field & Co., 111 N. State St., Chicago, Ill., plans by John Graham & Co., 1426 5 Ave., Seattle, department store, **$3,375,000**

▲ **B. C. Vancouver**—OFFICE—British Columbia Electric Co. Ltd., 425 Carrall St., plans by Sharp & Thompson, Berwick & Pratt, 1553 Robson St., office bldg., Burrard and Nelson Sts. **$2,000,000.**

Ont., London—APARTMENTS—McLean Constr. Co., 301 St. George St., two 3 story, bsmnt., 52x215 ft., brick, rein.-con. apartments. **$750,000.**

Ont., London—OFFICE—Syndicate, c/o A. Shepherd, 116 Dundas St., plans by Watt & Tillman, 343 Richmond St., 8 story, brick, steel office, **$800,000.**

(Continued on page 205)



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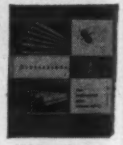

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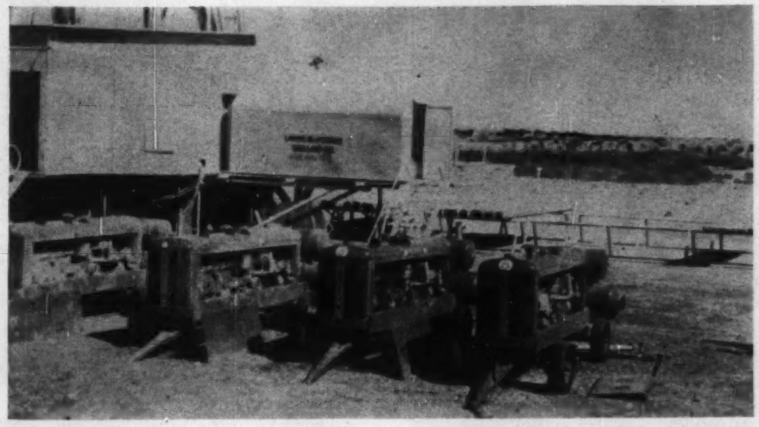

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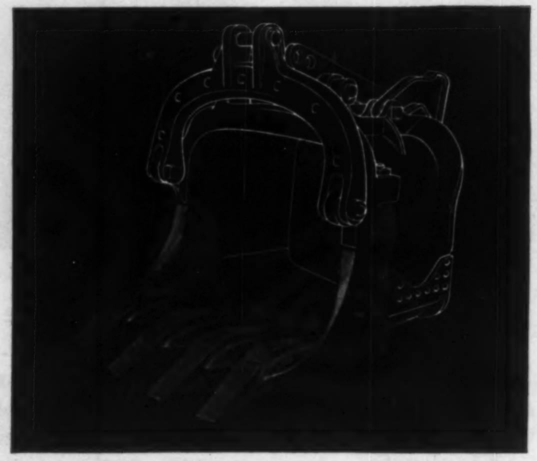

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(Continued from page 202)

▲ **Que., Montreal**—HOUSING DEVELOPMENTS—Bourget Constr., Inc., 601 Cote Vertu, Montreal, plans by Romeo J. Desjardins, 3605 Hochelaga St., 300 houses in housing development in L'Abord A Plouffe suburban area, **$3,000,000**; seven 2 story, bsmnt., 14-suites each, brick, stone apartment blocks, St. Laurent suburban area, **$595,000**; 90 home housing program in Pointe Claire suburban area, **$1,200,000.**

▲ **Que., Montreal** — APARTMENT — A. Cohen, c/o Charles Grenier, archt., 170 Geneva Crescent, Mount Royal, Montreal, 8 story, rein.-con. frame, apartment bldg., garage in bsmnt., Northcrest Place, **$1,000,000.** Henry Jasen & B. A. Eskenazi, 1410 Guy St., consult. engrs.

▲ **Que., Montreal**—SHOPPING CENTER—Furman Construction Ltd., 5950 Cote des Neiges Rd., shopping center, Abot and Major Sts. **$2,000,000.**

▲ **Que., Montreal** — HOUSING — Jay-Mar Constr. Co., Ltd., 545 St. Roch St., plans by Ben-Ami Shulman, 4175 Cote des Neiges Rd., 100-unit housing development, in Rosemount suburban area of Montreal, **$1,300,000.**

▲ **Que., Montreal**—HOUSING DEVELOPMENT—Parkdale Homes Development, 630 Dorchester St. West, plans by Gabriel Jarry, 7271 Querbes Ave., 100-unit housing development, Cullivier and Darling Sts. **$1,100,000.** Henry Jasen & B. A. Eskenazi, 1410 Guy St., consult. engrs.

Que., Montral—OFFICE—Rembrant Realties, Castle Bldg. Room 113, plans by Arnold Schrier, 4147 Sherbrooke St. W., 4 story office, Prudholme Ave. and Sherbrooke St. **$800,000.**

▲ **Que., Montreal**—COLLEGE—St. Jean de Brebeuf College, 3200 Cote St., Catherine Rd., plans by Roland Dumais, 3995 Sherbrooke St. East, 2 story, bsmt., 63 x 260 ft., rein.-con., frame, brick college addn., library, laboratory and recreation hall, **$2,-000,000.**

INDUSTRIAL BUILDINGS

▲ **Calif., Davis**—PLANT—Armco Drainage & Metal Products, Inc., 2600 7 St., Berkeley, metal fabrication plant. **$1,000,000.**

Calif., Redwood City—PLANT—L. H. Price Bldg. Specialties Co., 875 Bryant St., San Francisco, mfg. plant 24-acre site between the present Bayshore Hy. and proposed freeway route, **$500,000.**.

▲ **Colo., Grand Junction**—PLANT—Grand Junction Industries, Grand Junction, 120,000 sq. ft. sand and gravel plant and 3 story headquarters bldg. with helicopter landing pad. **$2,500,000.**

Ia., Webster City—PLANT—Phillips 66 Petroleum Co., Bartlesville, Okla., bulk plant propane plant and later a fertilizer plant. Approx. **$500,000.**

N. Y., Long Island City—FACTORY—Arthur Levien, 22-50 21st St., 2 story factory, Hunters Point Ave. and 30 St. **$500,000.**

Pa., Pottstown—WAREHOUSE—Firestone Tire & Rubber Co., Pottstown, warehouse. **$750,000.** CD 8/6/51.

▲ **Alaska, Sitka**—PLANT—Alaska Lumber & Pulp Co., Sitka, pulp plant. **$45,000,000.** H. Cavin, Bellingham, Wash., consult. engr.

UNCLASSIFIED

▲ **Mass., Boston**—OFF STREET PARKING—**City**, Real Estate Comn., City Hall Annex, plans by William Nelson Jacobs Assoc., engr-archts, Park Square Bldg., off street parking facility Scolley Square Howard St. Pemberton Square, **$1,500,000.** CD 10/20.

▲ **Mo., St. Louis**—SKATING RINK—City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12 and Market Sts., Zone 3, outdoor skating rink and recreational bldg. to be known as Mark C. Steinberg Memorial located in Forest Park west of 500 block south Kingshighway Blvd. **$1,000,000.** CD 4/26/43.

N. Y., Buffalo—TELEVISION STATION—Greater Erie Broadcasting Co., 315 Main St., television station, **$716,000.** Jansky & Bailey, Inc., 1735 DeSales St. N.W., Wash. 6, D. C., consult. engr.

▲ **N. Y., New York**—RECREATION CENTER—Dpt. Parks, Arsenal Bldg., 5 Ave. and 64 St., Proj. P-251, recreation center, Crotona Park. **$1,365,400.** CD 10/15/47.

R. I., Providence—TELEVISION STATION—The Outlet Co., 176 Weybosset St., television station WJAR at end of Blackstone Park. **$750,000.**

▲ **Texas**—GAS LINES—Pioneer Natural Gas Co., Amarillo, Tex., or c/o C. I. Wall, 1005 Texas Ave., Lubbock, laying gas distr. lines in city of Amarillo and some small surrounding towns, **$500,000**; in city of Panhandle and some small surrounding towns, **$500,-000**; line extens. to irrigation areas of customers, Midland-Amarillo areas, **$750,000**; exten. irrigation areas of customers, Lubbock area, **$1,000,000**; exten. irrigation areas of customers, Panhandle area, **$1,000,-000.**

▲ **Texas**—GAS LINES—Pioneer Natural Gas Co., Amarillo, Tex. and c/o C. I. Wall, 1005 Texas Ave., Lubbock, laying natural gas transmission lines in Panhandle area and some surrounding small towns, Carson Co., **$377,000**; laying natural gas transmission lines in Odessa and some small surrounding towns in Ector Co., **$750,000**; laying 50 mi. 12 in. gas transmission line between Midland and Odessa, Midland and Ector Counties. **$750,000.**

Alaska—ELECTRIC DISTR. LINE—Kenai Lake Electric Co-operative, Seward, electrical distr. lines from Seward up Kenai River to Henton's Lodge. **$500,000.**

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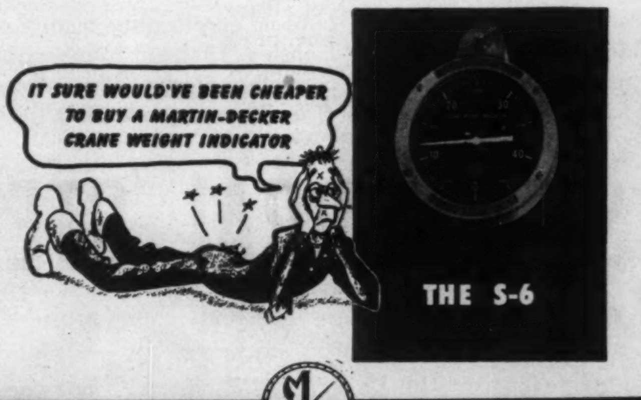
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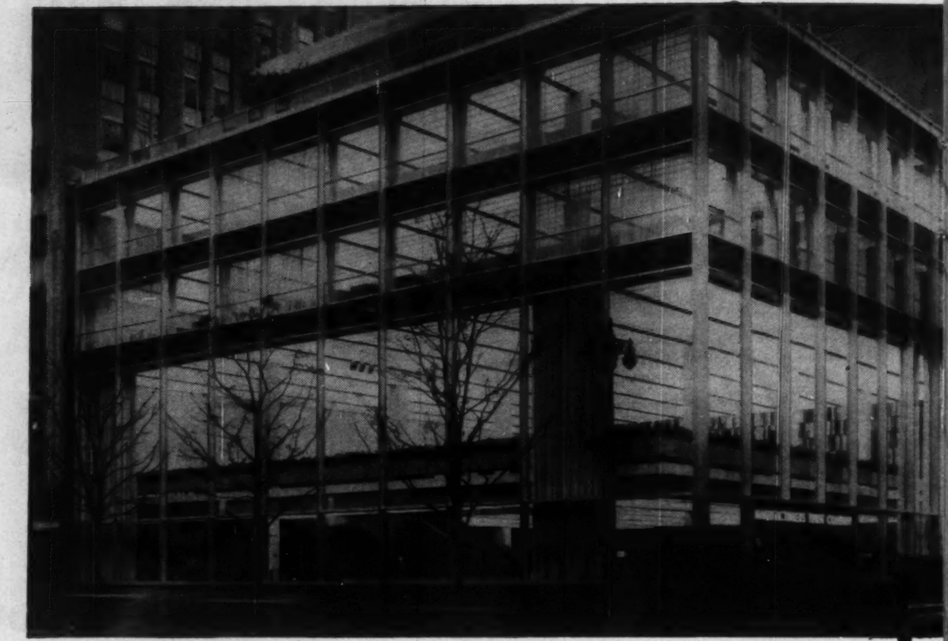

THE MANUFACTURERS TRUST COMPANY
New Fifth Avenue Office
Architect: Skidmore, Owings & Merrill.
Consulting Engineers:
Weiskopf & Pickworth.
General Contractor:
George A. Fuller Company
Structurals fabricated
by Ingalls Iron Works Company.

An engineering complication in the construction of the new Manufacturers Trust Company Office in New York dictated the need for an unusual cantilever application. Girders, 70 feet long and weighing seven tons each, stretch in two directions from the supporting columns, which are set back from the building line. The 43rd Street cantilever extends 20 feet 5 inches from the column line. Only eight exposed columns are on the main banking floor —an area of 11,000 square feet.

Exterior glass walls, offering no support to the structure, hang curtain-like from the cantilevers. With the second floor set back 10 feet from the exterior wall, the effect is a 32-foot high expanse of glass running from the ground level to the third floor.

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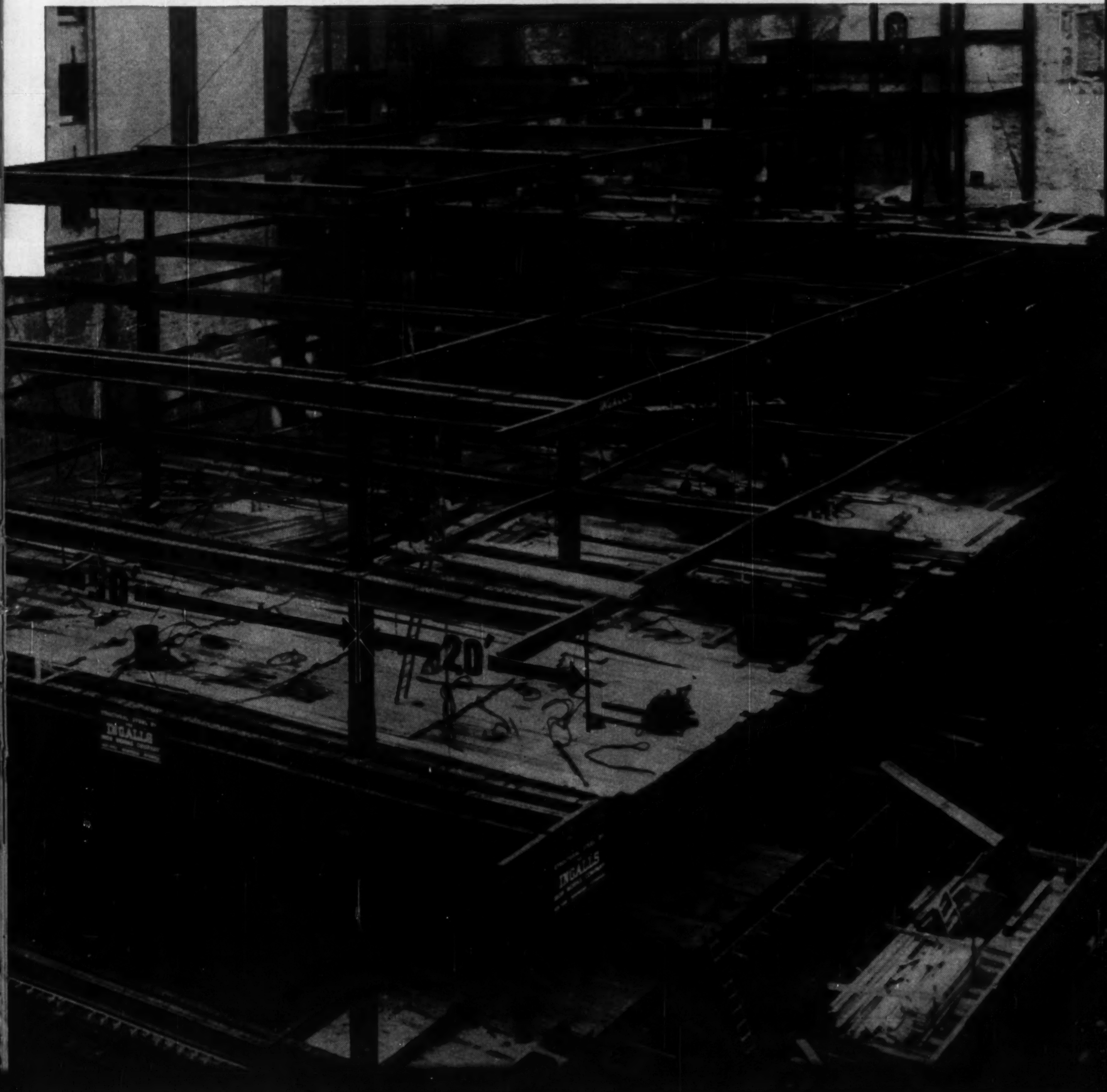

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NEW ENGLAND

BIDS ASKED—BUILDINGS

▲ **Mass., Roxbury**—CLINIC—BA 2/24—Hospital Teaching Clinic, Pilgrim Rd., Austin St., (selected list bidders), clinic, Pilgrim Rd. and Austin St. $1,000,000. Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, archts. Merrill Assoc., 210 South St., Boston, heating and ventilating engrs. CD 9/15/53.

Conn., New Britain—SCHOOL—BA 3/3—City, Supt. Schools, Walnut Hill School, elementary school, Alexander Rd. area, South of Stanley Homes Development. $923,000. Plans deposit $150. CD 7/20.

Mass., North Brookfield — SCHOOL — BA 3/4 — Town, North Brookfield High School, Grove St., brick Junior-Senior High School. $500,000. Plans deposit $50. Julian W. Goodrich, 215 College St., Burlington, Vt., archt. CD 8/3.

▲ **Mass., North Andover**—PLANT—BA 3/8—Western Electric Co., 165 Broadway, New York, N. Y., superstructure for mfg. plant. $8,000,000. Charles T. Main, Inc., 80 Federal St., Boston, engr.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MASSACHUSETTS—Commonwealth of Mass., Metropolitan Dist. Comn., 20 Somerset St., Boston,
F. E. Daddario Corp., 73 Tremont St., Boston, Mass. LB **$599,657**, est. $600,000. Proj. 881 wid'n. Dorchester Bay Bridge, Wm. T. Morrissey Blvd., Dorchester. Kilham, Hopkins, Greeley & Brodie, 9 Arlington St., Boston, archts. CD 1/11.

▲ **MASSACHUSETTS**—Massachusetts Turnpike Auth., 80 Boylston St., Boston,
Gilbane Building Co., 90 Calverly St., Providence, R. I. CA **$6,294,657**, est. $6,200,000. Contr. 51-080 hy. and bridge constr., Grafton, Upton, Westborough and Hopkinton. CD 1/25, under LB.

▲ **MASSACHUSETTS**—Massachusetts Turnpike Auth., 80 Boylston St., Boston,
Nello L. Teer Co., Durham, N. C. CA **$4,306,729**, est. $4,300,000, Contr. 51-070 hy. and bridge, Charlton-Oxford and Auburn. CD 1/10, under LB.

▲ **MASSACHUSETTS**—Massachusetts Turnpike Auth., 80 Boylston St., Boston,
Grandview Constr. Corp., 740 S. Fulton Ave., Mount Vernon, N. Y. CA **$2,386,905**, est. $2,200,000. hy. and bridge constr., Contr. 51-190, Chicopee. CD 1/18, under LB.

▲ **MASSACHUSETTS**—Massachusetts Turnpike Auth., 80 Boylston St., Boston,
Gilbane Building Co., 90 Calverly St., Providence, R. I. CA **$1,263,085**, est. $1,000,000. Contr. 51-051 Quaboag Valley Bridge, Palmer-Brimfield. CD 1/20, under LB.

RHODE ISLAND—State of R. I. & Providence Plantations, F. A. Adams, purch. agt., State House, Providence,
Campanella & Cardi Constr. Co., 780 Jefferson Blvd., Warwick, R. I., LB **$242,064**, est. $200,000. b. conc. Main Ave. from Post Rd. to West Shore Rd., No. 616, Contr. 5504, FAP S-023 (1), Warwick. Bids Feb. 2. CD 1/25.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **William & Roland Hauke**, 21 Woodbury Rd., Burlington, Vt. Owner Builds. **$1,000,000.** SPORTS-CIVIC CENTER, North Ave. adjoining new shopping center, BURLINGTON, VT. Julian Goodrich, 215 College St., Burlington, Vt., archt.

Thomas T. Tuck, 82 Hancock St., Lexington, Mass. Owner Builds. **$350,000.** 5 APARTMENTS 1-25 Anselm Terrace, BRIGHTON, MASS. Gordon Northrup, 266 Lake St., Belmont, Mass., archt.

Reznick Constr. Co., Inc., 303 Freeport St., Dorchester, Mass. LB **$393,300.** Elementary SCHOOL, adjacent to Junior-Senior High School, WEST BRIDGEWATER, MASS. Town, School Comn., Arthur W. Steptoe, chn., West Bridgewater, Mass. Bids Feb. 1. CD 1/14.

Gordon & Swartz, Park St., Wrentham, Mass. LB **$357,016.** Elementary SCHOOL, Taunton St., WRENTHAM, MASS. Town, School Bldg. Comn., Wrentham, Mass. Bids Feb. 3. CD 1/17.

Yates & Kaveneusky, 18 Rampart Rd., South Norwalk, Conn., Owner Builds, **$350,000**, 32 RESIDENCES, South Ave. and Gerdes Rd., NEW CANAAN, CONN.

Fabrizio & Martin, Inc., 21 McLaren Rd., Darien, Conn., CA, **$370,500**, est. $350,000, Katherine T. Murphy School alterations, addns., Horton St., STAMFORD, CONN. City Bd. Educ., Supt Schools, 151 Broad St., Stamford, Conn. Bids Dec. 1. CD 12/8, under LB.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

D. C., Wash.—BA 2/25—D. C. Dpt. Hys., 499 Pa. Ave. N. W., Zone 1, grading, storm sewer, drainage, paving the west approaches to the East Capitol Street Bridge and bridge wearing surf. from 19 St. to Anacostia Ave., Fed. Aid Proj. F-42 (15), Contract No. 1 C; adv. ENR 2/17. CD 11/21/51.

N. Y., Greece—BA 2/25—Town of Greece, 2505 Ridge Rd. West, Rochester, Zone 13, general constr.; plumbing and drainage; heating and ventilating; electrical wiring and fixtures for increase and imprv. facilities in Sanitary Sewer Dist. No. 1, by the remodeling of

(Continued ont page 211)

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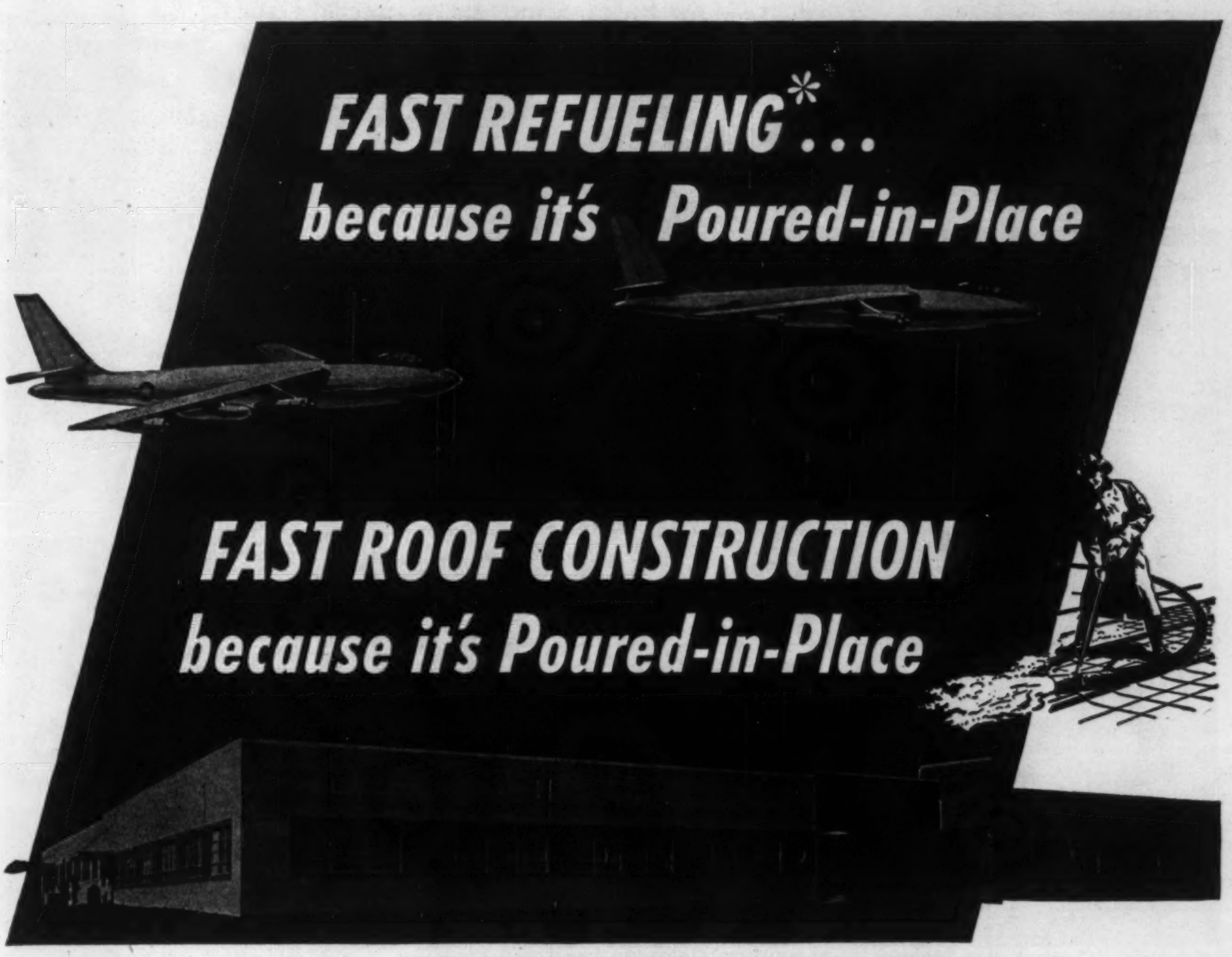
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(Continued from page 208)

sewage treatment plant. $289,300. Plans deposit $25 each. Morrison & Morrison, 39 State St., Rochester, engrs.

NEW JERSEY—BA 3/8—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Hudson and Bergen Counties—Contract W-5, grading, drainage, structures and paving in connection with widening N. J. Turnpike from Lincoln Tunnel interchange Secaucus to George Washington Bridge interchange in Ridgefield Park. Plans deposit $15. Porter, Urquahart & Beavin, 415 Frelinghuysen Ave., Newark, engrs.

New York-New Jersey—SERVICE BLDG., etc.—BA 3/8—At office of Chief Engineer of The Port of New York Auth., 111 8th Ave., New York 11, N. Y. Contr. HT-160.001, New Jersey Service Bldg. and Admin. Bldg. alterations. at Jersey City, N. Y., Holland Tunnel. CD 1/18/54.

† N. Y., **Schenectady** — GASOLINE FACILITIES — BA 3/10—U. S. Property & Fiscal Officer for New York, New York State Arsenal, 201-64th St., Brooklyn, Zone 20, rehabilitation of gasoline facilities and cleaning gasoline storage tanks, Schenectady County Airport, Inv. NG-30-192-55-20.

BIDS ASKED—BUILDINGS

▲ **Md., Baltimore**—SCHOOL—BA 2/23—City, Bureau Bldg. Constr., 410 Municipal Bldg., Zone 2, concrete, steel, masonry Sinclair Lane Elementary School, $1,000,000. Plans deposit $50. Edw J. Hoffstetter & John M. Walton, 2025 E. North Ave., archts. CD 11/9.

N. Y., **Ossining**—MOTHER HOUSE—BA 2/24—Maryknoll Sisters, Pines Bridge Rd. (selected list of bidders), 3 story Maryknoll Mother House Addn. $500,000. York & Sawyer, 101 Park Ave., New York, Zone 17, archts.

N. Y., **Utica**—CHURCH—BA 2/24—Blessed Sacrament Parish, Rev. Edward P. Kenefrick, pastor, St. Agness Ave., church, $450,000. James J. O'Shaughnessy, 80 Boylston St., Boston, Mass. archt. CD 1/19.

▲ N. Y., **Marcy**—MEDICAL-SURGICAL—BA 3/17—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany, medical-surgical bldg., Marcy State Hospital. Total est. $6,000,000. Plans deposit $50. CD 7/9/53.

SOON LETS CONTRACT—BUILDINGS

▲ **Md., Baltimore**—SHOPPING CENTER, etc.—Mondawin Shopping Center, Liberty Heights Ave. and Reisterstown Rd., soon lets contract steel, concrete masonry shopping center, 40 to 45 stores, theater, department store, parking areas, $10,000,000, Fisher, Nes, Campbell & Assoc., 1020 St. Paul St., Baltimore, Zone 2, archts. Van R. Saxe, 1701 St. Paul St., Zone 2, struct. engr. Egli & Gompf, 1019 N. Calvert St., Zone 2, mech. engrs. CD 5/14/53.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Cassa Constr. Co., 66 Wyandanch Ave., Babylon, N. Y., LB **$224,276**, playground adjacent to P.S. 213 between 230 St. and 233 St., south of 67 Ave., Queens Boro, Contr. Q-356-154, BAYSIDE, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York 21, N. Y. Bids Feb. 4. CD 1/27.

† **Charles F. Vachris, Inc.**, 9024 Ditmas Ave., Brooklyn, N. Y., CA **$189,300**, sheet pile sea plane ramp at U. S. Coast Guard Air Station, Inv. 16601, BROOKLYN, N. Y. Commander, Third Coast Guard District, 80 Lafayette St., New York, N. Y. Bids Dec. 30. CD 12/15.

Edenwald Contr. Co., 151-45 6th Rd., Whitestone, N. Y. LB **$705,894**, Contr. 45B, completion of ramp connections between Pearl St. at Robert F. Wagner Sr. Pl. and elevated public highway in South St., NEW YORK, N. Y. President Manhattan Boro, Municipal Bldg., New York 7, N. Y. Bids Feb. 4. CD 1/18.

▲ **NEW JERSEY**—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Cayuga Foundation Co., 30 Vesey St., New York, N. Y., LB, **$1,862,975**, Contract No. 10-A, concrete deck for Newark Bay Bridge on Newark Bay-Hudson County Extension of N. J. Turnpike for east abutment in Bayonne to Doremus Ave. in Newark, Hudson and Essex Counties. Bids Feb. 3. CD 1/17.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Tamis Homes**, c/o Edelson Realty Co., Inc., 109 W. Main St., East Islip, N. Y. Owner Builds. **$1,250,000.** 212 HOUSES, tract at Tamarac Ave. and Lowell Ave., CENTRAL ISLIP, N. Y.

▲ **Suburban Green Homes**, c/o Trylon Realty Co., 98-69 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$3,600,000.** 225 HOUSES, 45-acre tract, Old Westbury Rd., north of Hempstead Turnpike, EAST MEADOW, N. Y.

Cindy Manor Homes, c/o Edelson Realty Co., Inc., 109 W. Main St., East Islip, N. Y. Owner Builds. **$720,000.** 120 HOUSES tract on Sunrise Hy., east of Rte. 111., ISLIP, N. Y.

Gens-Jarboe, Inc., 101 Park Ave., New York 17, N. Y. CA Est. **$350,000.** PHYSICS RESEARCH LABORATORY, to be called George B. Pegram Laboratory, on site east of Pupin Physics Laboratory on 120 St., near Broadway, NEW YORK, N. Y. Columbia University, 116 St. and Broadway, N. Y. CD 10/27.

▲ **Westwind Estates**, c/o Bonded Realty Corp., Sunrise Hy. Lindenhurst, N. Y., Owner Builds. **$1,500,000.** 137 HOUSES, Sunrise Hy., east of Deer Park Rd., WEST ISLIP, N. Y.

Clover Park Homes, c/o Bonded Realty Corp., Sunrise Hy., Lindenhurst, N. Y. Owner Builds. **$350,000.** 27 HOUSES, Pease Lane and Merrick Rd., WEST ISLIP, N. Y.

Willard Bergman, c/o A. H. Salkowitz, archt., 37-60 82 St., Jackson Heights, N. Y. Owner Builds. **$350,000.**

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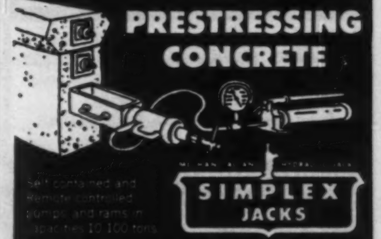
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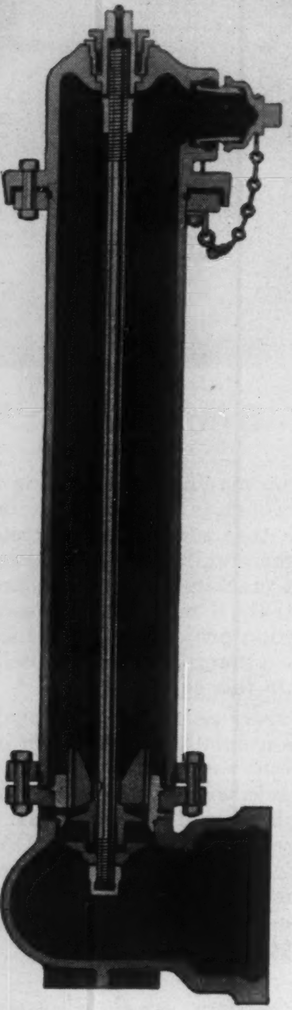
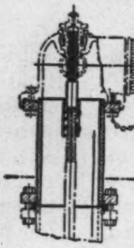


A community can rest easy when it is protected by R. D. Wood Swivel-Joint Hydrants. Trouble can be a long time coming, but when it comes these great hydrants are ready. Installation and maintenance costs are low. They work instantly, reliably. Water-carrying areas are generously sized for full flow and maximum pressure. Every point of friction is protected by at least one bronze surface. Accurately formed threads and fitted parts make them interchangeable with other hydrants of the same size. Compression-type valve stops leakage when hydrant is broken in traffic accident.



Extension piece can be inserted between hydrant head and barrel, or between barrel and elbow, without shutting off water supply.

Breakable flange and stem coupling can be furnished at extra cost. Both are constructed so that a heavy blow will snap the ring and coupling, thus saving more costly damage to the hydrant itself. Both can be replaced quickly and inexpensively with spares. No digging necessary.

R.D. Wood Swivel Joint Hydrants

Public Ledger Building, Philadelphia 5, Pa.

Manufacturers of "Sand-Spun" Pipe

(centrifugally cast in sand molds) and R.D. Wood Gate Valves

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NEW YORK CITY SALT LAKE CITY

20 HOUSES, tract at 21 Ave. and 154 Ave., WHITESTONE, N. Y.

Boulevard Manor Homes, c/o Rudolph Novak, archt., 89 Central Ave., Clifton, N. J. Owner Builds. **$570,000.** 38 HOUSES on tract on Roosevelt Blvd. off East Ridgewood Blvd. and Route 17, PARAMUS, N. J.

Belli Co., 2127 Hamilton Ave., Trenton, N. J., CA **$900,000,** steel, brick SHOWROOM, WAREHOUSE, SERVICE CENTER and OFFICE for electrical appliance distr., Olden Ave. Extension, Ewing Twp. TRENTON, N. J. Fineburg's Inc., South Broad St., Trenton, N. J. Kramer, Hirsch & Carchidi, 115 W. state St., Trenton, N. J., archts. Awarded Feb. 2.

Lutsky & Rothenberg, c/o C. J. Kordys, archt., 116 Passaic St., Passaic, N. J. Owner Builds. **$450,000.** 31 HOUSES on tract at Haddonfield-Berlin and Evesham Rds., VOORHEES TWP., N. J.

T. R. **Reiff, Inc.,** 2031 Chew St., Allentown, Pa., CA **$543,700,** general constr. Contr. No. 1, Hiram W. Dodd Elementary SCHOOL, ALLENTOWN, PA. Allentown School Dist., 31 S. Penn St., Allentown, Pa. Bids Jan. 12. CD 2/2, under LB.

Branna Constr. Co., 625 Farmers Bank Bldg., Pittsburgh, Pa., CA **$600,000.** 2 story, part bsmnt., 145x237 ft. brick, block, steel frame EDUCATIONAL BLDG. addn., alterations, PITTSB' H, PA. Rodef Shalom Congregation, 5 and Morewood Sts., Pittsburgh, Pa. Bids Jan. 10. CD 12/16.

St. Pius R. C. Congregation, 3020 Pioneer Ave., Pittsburgh, Pa., Separate Contracts, Approx. **$350,000.** 2 story, bsmnt., brick, block, steel SCHOOL, CHURCH and CONVENT, PITTSBURGH, PA. Nathan Cantor, 121 S. Negley St., Pittsburgh, Pa., archt., McCloskey Co., Liberty and Denny Sts., Pittsburgh, Pa., engr.

▲ **John A. Johnson & Sons, Inc.,** 303 41 St., Brooklyn, N. Y. CA **$3,165,300.** Cherry Hill HOMES, Exten. No. 2, 2 story, bsmnt., brick 362 units, BALTIMORE, MD. Baltimore Housing Auth., 709 E. Eager St., Baltimore 2, Md. CD 12/30, under LB.

Gordon C. Sugar, 7926 Stevenson Rd., Stevenson, Md. Owner Builds. **$600,000.** 30 brick RESIDENCES, Long Meadow Estates, STEVENSON, MD.

▲ **Cafritz Constr. Co.,** 1404 K St. N. W., Wash., D. C. Owner Builds. **$1,040,000,** 13 three story brick, cinder block 208-unit APARTMENTS, 4th, Galloway and Hamilton Sts. N. E., WASH., D. C. Leroy Werner, 1404 K St. N. W., Wash., D. C., archt.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

† S. C., **Sumter**—BUILDING—BA 2/23—Contg. Officer, Shaw Air Force Base, Sumter, 32x77 ft. concrete block bldg., Shaw Air Force Base, IFB 38-601-55-34. CD 9/25/51.

N. C., **Hendersonville**—BA 2/24—Bd. Water Comrs., Hendersonville, 21,000 lin. ft. 16 in. class 150 water mains; 9,800 lin. ft. 18 class 150 water mains. Plans deposit $50. John R. Gove, Chapel Hill, engr. 2/17/55.

† Va., **Norfolk**—VAULT—BA 2/24—P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Zone 11, concrete vault, Armed Forces Staff College, U. S. Naval Base, NOY 86497, Spec. 43135. Plans deposit $10.

† Va., **Portsmouth**—FIRE ALARM SYS.—BA 2/24—P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, Zone 11, rehabilitation fire alarm sys., Naval Ammunition Depot, St. Juliens Creek, NOY 85947, Spec. 43120. Plans deposit $10.

W. Va., **Princeton**—BA 2/25—Sanitary Bd., City Hall Units 2 and 3 primary sewage treatment plant, $400,000. Plans deposit $80. Sittle Engineers, Inc., Peoples Bldg., Charleston, engr.

† S. C., **Sumter**—CONTROL TOWER—BA About 3/11—U. S. Eng., Custom House, Charleston, control tower, Shaw Air Force Base, No. 38-081-55-40. CD 9/25/51.

† N. C., **Fort Bragg**—LIGHTING—BA About 3/17—U. S. Eng., 308 Customhouse, Wilmington, c. airfield and approach lighting, Pope Air Force Base, ENG-31-075-55-40. Plans deposit $3.20. CD 12/26/51, under Public Buildings.

BIDS ASKED—BUILDINGS

Ga., **Trenton** — SCHOOLS — BA 2/23 — Georgia State School Bldg. Auth., 41 Exchange Pl. N.E., Atlanta, Dade County High School, Davis Elementary School addn., completion of Davis Elementary School, Hoker Elementary School, completion of Trenton Elementary School North Dade Elementary School addn. Plans deposit $50. Extended date. Hunt-Caton & Assocs., 1225 James Bldg., Chattanooga Tenn., archts. CD 1/21.

▲ La., **Marksville**—SCHOOL—BA 3/1—Avoyelles Parish School Bd., school constr. in new Consolidated Dist. No. 1, $1,750,000.

Ky., **Frankfort**—DORMITORY—BA 3/3—State, Div. Purchases, men's dormitory at Kentucky Training Home, $325,000. Brock & Johnson, 159 Barr St., Lexington, archts.

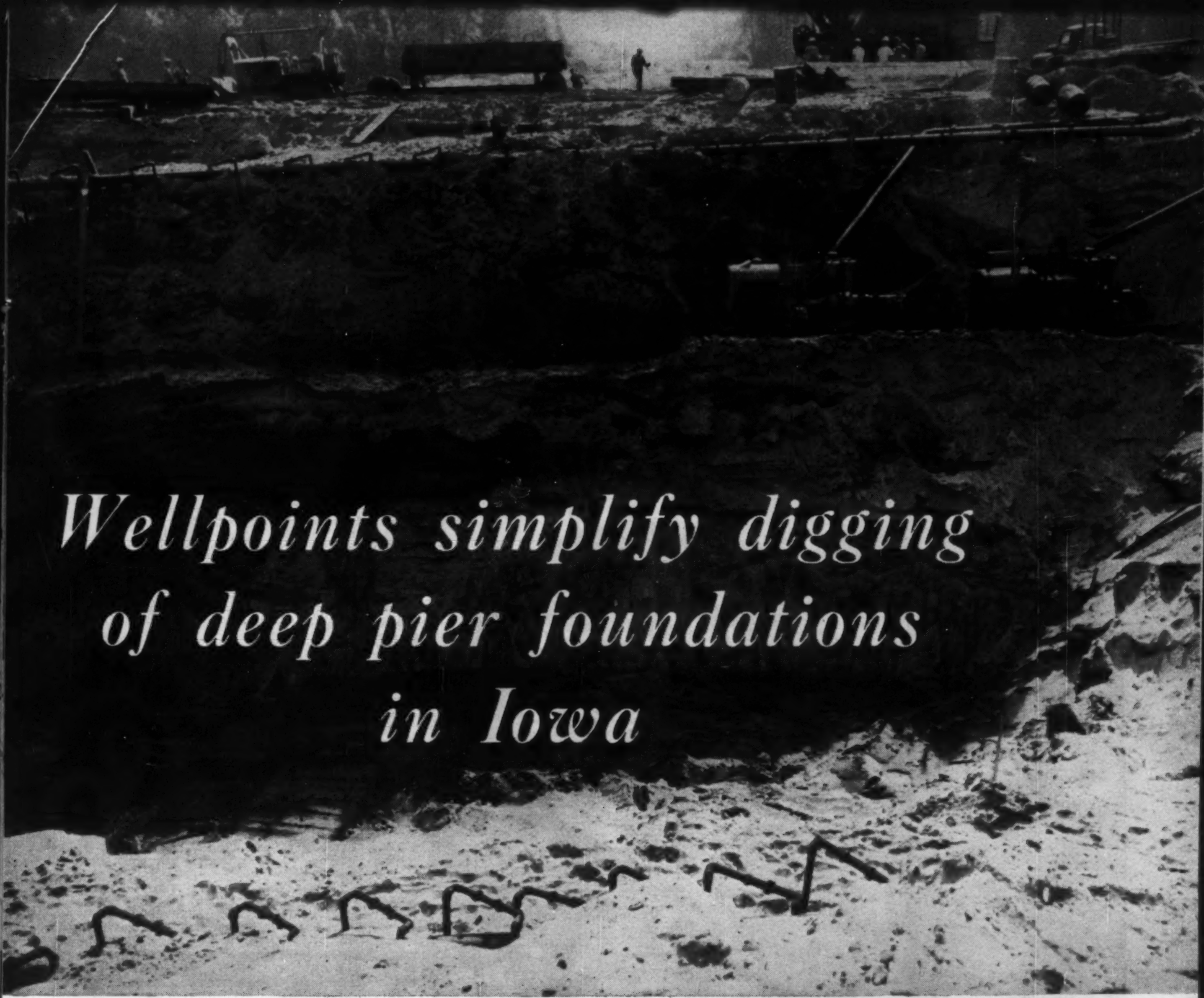
W. Va., **Morgantown**—DORMITORY—BA 3/5—W. Va. University Bd. Governors, Administration Bldg., 290-student brick, steel, glass women's dormitory, $700,000. Alex B. Mahood, 701 Law & Commerce Bldg., Bluefield, archt. CD 4/29.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

R. N. Hewitt Corp., 703½ Pennsylvania Ave., Charleston, W. Va., LB, **$107,313** WW intake and pump house ST. ALBANS, W. VA. Mun. Utility Comn.,

(Continued on page 214)



Wellpoints simplify digging of deep pier foundations in Iowa

Substructure contractors: McCarthy Improvement Co., Davenport, Iowa

This is Pier #4 for the new Clinton-Illinois Bridge which will soon carry traffic over the Mississippi River. Subgrade is 25′ below normal water level. A Moretrench Wellpoint System keeps the job progressing smoothly in the dry.

No need for expensive sheeting. Banks are sloped, leaving plenty of room for quick, easy excavation and for safe pile driving operations. Thirteen additional piers are being handled in the same economical way.

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New Jersey

Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington

Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario

(Continued from page 212)

City Bldg. St. Albans, W. Va. Bids Feb. 1. CD 1/24.

▲† **T. A. Loving & Co.**, Bank of Wayne Bldg., Goldsboro, N. C., CA **$2,116,242**. dormitories, mess and utilities, Seymour-Johnson Air Force Base, ENG-31-075-55-31, GOLDSBORO, N. C. U. S. Eng., 308 Customhouse, Wilmington, N. C. Bids Jan. 13. CD 1/25, under LB.

▲ **Lee Const Co.**, 311 W. Worthington Ave., Charlotte, N. C., LB **$1;4557,592**, 12 m. g. sewage treatment plant, on Walnut Creek, RALEIGH, N. C. City, W. H. Carper, city mgr., City Hall, Raleigh, N. C. Bids Feb. 3. CD 12/30.

▲† **J. C. Critcher, Inc.**, Technical Bldg., Asheville, N. C., CA **$2,022,227**, grading, drainage, paving of airfield, Donaldson Air Force Base, No. 38-081-55-27, GREENVILLE, S. C. U. S. Eng., Custom House, Charleston, S. C. Bids About 2/5. CD 12/30.

▲† **MacDougald Constr. Co.**, 1625 Northside Dr. N.W. Atlanta, Ga., CA **$3,615,000**, 10,000 ft. runway, airfield pavements, Fy-55, Warner Robins Air Force Base, ENG-09-133-55-24 MACON, GA. U. S. Eng., 200 E. St. Julian St., Savannah, Ga. Bids Jan. 21. CD 1/26, under LB.

Dethlefs & Harmon, Anniston, Ala., LB **$310,259** Contract A, lake intake and raw water pumping station, water treatment plant and elevated storage tank;

Tri-City Constr. Co., Sheffield, Ala., LB **$68,200** Contract B, water intake and pumping station; LB **$375,903**, Combination Contracts A and B;

Chattanooga Boiler & Tank Co., 1011 E. Main St., Chattanooga, Tenn., LB **$61,118**, Contract C 500,000 gal elevated steel water tank, ALBERTVILLE, ALA. Water Supply Bd., Albertville, Ala. Bids Feb. 1. CD 1/11.

† **H & F Engineering Co.**, Hy. 49 S, Jackson, Miss. CA **$287,858**. addnl. bldgs., 13 barracks, 4 squadron operations and training bldgs., crash truck station, sewage ejector station, utilities, roads, for Air National Guard raining Center at Gulfport Municipal Airport, GULFPORT, MISS. U. S. Eng., 2301 Grant St., Mobile, Ala. Bids Feb. 1. CD 1/20.

† **Great Lakes Dredging & Dock Co.**, 124 Camp St., New Orleans, La. CA **$423,533**. Gulf Intracostal Waterway Port Allen Lock and Canal dredging, Indian Village to Morley, Port Allen, Inv. 55-150, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans 9, La. Bids Jan. 31, awarded Feb. 3. CD 1/31, under LB.

▲ **TENNESSEE**—State Hy. Dpt., Nashville,

J. Paul Nichol, Centerville, Tenn., LB **$99,183**, grav. or chert. surf. const. 4 bridges 5.067 mi. Proj. S-8071-(4), Tipton Co;

Taylor Paving Co., Elizabethton, Tenn., LB **$282,250**. bit. materials wid'n. and resurf. 9.393 mi. State Hy. 36, Proj. SAP-1122-A, Unicoi Co;

Tennessee Asphalt Co., Candoro Ave., Knoxville, Tenn. LB **$152,112**, crushed stone or grav. surf. 4.857 mi. Sec. Rte 2407, Proj. S-2407 (3), Knox Co.;

Warren Brothers, 1900 Hayes St., Nashville, Tenn., LB **$112,433**, bit. materials wid'n, and resurf. 5.4 mi. State Rte. 41, Proj. SAP 949-A, Sumner Co.;

Wesco Paving Co., Airport Rd., Chattanooga, Tenn. LB **$86,918**, bit. materials resurf. 1.384 mi. State Rte. 2, Proj. SAMP-225-A; bit. materials resurf. 1.148 mi. Proj. SAMP-226-A, Hamilton Co;

Wright Contg. Co., 504 25th Ave., Columbus, Ga., LB **$195,976**. bit. materials surf. 10.759 mi. State Rte. 26, Proj. F-026-1-(14), DeKalb and Wilson Counties;

B. F. Young & Sons, Johnson City, Tenn., LB **$161,608**. bit. materials surf. 11.899 mi. State Rte. 55, Proj. F-062-2-(1), Moore and Coffee Counties;

Bowyer & Johnson, Crook Bldg., Jackson, Tenn., LB **$789,319**, c. conc. 9.03 mi. State Rte. 11, Proj. F-011-3-(5), Robertson Co.;

Brown Bros., 1701 Central Ave., Chattanooga, Tenn., LB **$97,692**, wid'n, paving, const curb, gutters, sidewalks 0.176 mi. sect. of 9th St., Proj. U-072-1-(2) Hamilton Co.;

Burns & Baker, Third Natl. Bank Bldg., Nashville, Tenn., LB **$340,860**, crushed stone and bit. materials surf., const 3 bridges 5.963 mi. State Rte. 96, Proj. F-070-1-(1), Dickson Co.; LB **$98,444**, crushed stone surf., const box type bridge 2.964 mi. State Rte. 109, Proj. No. SAP-998-c, Wilson Co.;

W. T. Cutchin & Assocs., Dyersburg, Tenn., LB **$73,552**, grav. or chert. surf., constr. box type bridge 4.844 mi. Sec. Rte. No. 8011, Proj. No. S-8011-(1), Weakley Co.;

Chester L. Hamby, Harriman, Tenn., LB **$79,617**, crushed stone surf. 4.981 mi. Sec. Rte. 2518, Proj. No. S-2518-(1), Monroe Co.;

A. B. Long, Harriman, Tenn., LB **$74,358**, wid'n., resurf. drainage, const curb, gutter, sidewalks 0.22 mi. State Rte. No. 1, Proj. SAMP-223-A, Roane Co.;

McDowell & McDowell, 718 Murfreesboro Rd., Nashville, Tenn., LB **$239,180**, crushed stone and bit. materials surf., const box type bridge 1.758 mi. State Rte. 1, Proj. F-001-5-(28), Rutherford Co. Bids Feb. 4. CD 1/14.

BUILDINGS

LOW BIDS AND CONTRACTS

West Building Co., Reynolds Bldg., Winston-Salem, N. C. CA **$463,069**, 100,000 sq. ft. SHOPPING CENTER (20-store) WINSTON-SALEM, N. C. Merchants Development Co., Reynolds Bldg., Winston-Salem, N. C. Bids Nov. 23. CD 11/4.

General Constr. Co., 1815 Blanding St., Columbia, S. C. CA **$749,460**, NURSES HOME, CHARLESTON, S. C. Medical College of South Carolina, 1 Lucas St., Charleston, S. C. Bids Jan. 19. CD 1/25, under LB.

F. Miller & Sons, Box 921, Lake Charles, La. LB **$763,000**. seven 120 x 200 ft. concrete, steel BUILDINGS, incl. grading, soil compaction, drainage, LAKE CHARLES, LA. Lake Charles Harbor & Terminal Dist., 424 Pujo St., Lake Charles, La. F. Shutts & Sons, 524 Pujo St., Lake Charles, La., engrs. CD 6/6/46. under Unclassified.

▲ **Texarkana Constr. Co.**, Box 1079, Texarkana, Tex. CA **$1,049,948**. GRADE SCHOOL and FOOD PRESERVATION UNIT, Gilliam, SHREVEPORT, LA. Caddo Parish School Bd., Shreveport, La. Bids Feb. 1, awarded Feb. 2 CD 1/18.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

Wis., **Milwaukee**—BA 2/24—Sewerage Comn. of City of Milwaukee, Jones Island, Milwaukee, Zone 1, dryer, furnace and structural steelwork, $140,000. Ray D. Leary, P.O. Box 2079, Milwaukee, Zone 1, ch. engr. CD 12/17.

Ill., **Peoria**—BA 3/8—Peoria Sanitary Dist., Darst St. and River St., sanitary sewers in Herman Hy. $140,000. CD 1/9/51.

▲† O., **Dayton** — BIO-ACOUSTICAL FACILITY — BA 3/10—U. S. Eng., P.O. Box 59, Louisville, Ky., bio-acoustical facility, Wright-Patterson Air Force Base, ENG-15-029-55-49. $1,000,000. Extended date. CD 1/26.

Ind., **Mount Vernon**—BA 3/15—City, Paul Hironimus, mayor, City Bldg., Div. A, new gravity-type water filtration plant, revisions to existing pump station, raw water pump and appurtenant work; Div. B, installing 28,000 ft. c.i. mains to 12 in., valves, hydrants, services, meter and extensions in existing raw water intake line to Ohio River; Div. C, 500,000 gal. elevated tank, foundations, etc. Plans deposit $30. Paul J. Kleiser & Assoc., 671 Tippecanoe St., Terre Haute, engrs. CD 8/25.

Wis., **Waupaca**—BA 3/22—City, City Hall, enlarging sewage disposal plant, tanks, digester controls. $100,000. Baxter & Woodman, 123 N. Williams St., Crystal Lake, Ill., engrs. CD 10/14/53.

BIDS ASKED—BUILDINGS

Ill., **Wilmette**—SCHOOL, etc.—BA 2/22—St. Francis Xavier Church, 912 Linden Ave., school, gymnasium and auditorium addn. $350,000. T. Clifford Noonan, 80 E. Jackson St., Chicago 4, Ill., archt. CD 2/8/54.

Ind., **New Haven**—SCHOOL—BA 3/3—School Bd., Paul Harding, school supt., superstructure for Senior High School, $600,000. LeRoy Bradley, 1115 S. Clinton St., Fort Wayne, archt.

Wis., **Madison**—MEN'S DORMITORY—BA 3/3—University of Wisconsin, Madison, 2 story, bsmnt., 31x104 ft., men's dormitory; 2 story, bsmnt., 33x91 ft. women's dormitory. Plans deposit $15. Weiler & Strang, 114 N. Carroll St., engrs.-archts.

(Continued on page 218)

Erects itself . . .
completely set up
in only 23 minutes.

Tow it right to the jobsite.

Ready-rigged tower unfolds like a jack-knife.

Pay only one man instead of 5

...with BUCK Heavy-Duty Hoisting Machine

Save profits for yourself. Instead of hiring four or five men to set up hoisting operations, use only *one* . . . and the BUCK Hoisting Machine.

BUCK erects itself, works itself, lowers itself . . . lifts full ton of materials to any desired level. Tower is self-erecting to 40 ft. unloading height . . . can be used with easy-to-add sections for greater height. Automatically retracting wheels eliminate heavy lifting, skidding and jacking. Self-dumping concrete bucket and Chicago boom available as accessories.

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. . . with lightweight, versatile

LACLEDE STEEL JOISTS

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More work, because a General Motors Diesel is a "high torque" engine. And torque—as much as developed horsepower—measures an engine's working ability.

Faster work, because a GM 2-cycle Diesel, with its responsive governor, efficient fuel injectors and power at every piston downstroke, gives you instant pickup in response to changing loads.

Less cost, because a General Motors Diesel burns fewer gallons of safer, cheaper fuel. Also a GM Diesel costs less to buy and the parts cost less than for other Diesels of comparable ratings.

No matter where your contracts take you, you'll find GM Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts. Check your local distributor today for full details on dependable, low-cost Diesel power for your equipment, or write direct for more information.

PURCHASED 23 GM DIESELS SINCE 1947

This LeTourneau-Westinghouse Tournapull is part of an earth-moving fleet used by the Lone Star Steel Company of Lone Star, Texas. The Company, one of the largest producers of steel in the Southwest, has been a consistent user of General Motors 2-cycle Diesel engines in several different kinds of earth-moving, construction and mining equipment for better than seven years.

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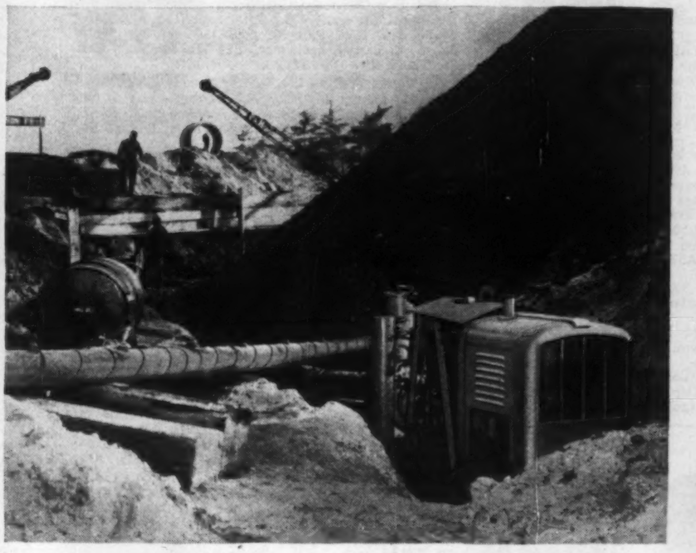
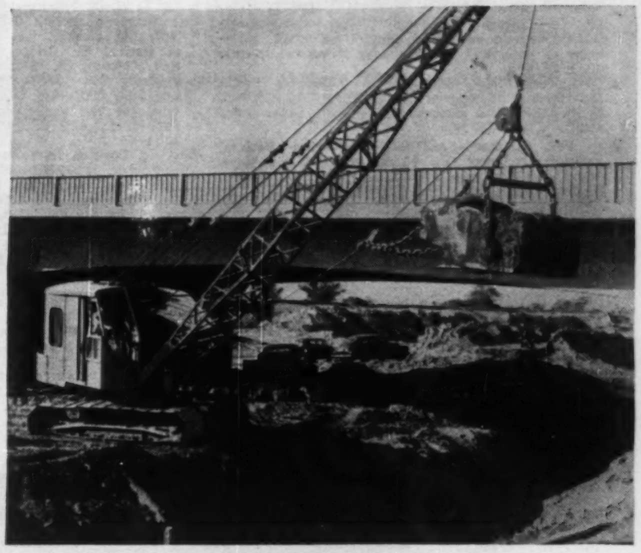


SAVING $170.00 A MONTH IN FUEL ALONE

United Construction Company cut fuel costs over 60% and reduced maintenance costs when they *switched* from gasoline to GM Diesel power on their Moretrench pumps. The GM Diesels worked 24 hours a day, 7 days a week—eliminated stops formerly required to pull and service spark plugs every three days and to replace them every three weeks.



13,000 HOURS—NO REPAIRS

General Contractor A. H. Famularo bought this GM Diesel-powered Northwest 25 Crane in April 1947. In 13,000 hours he never had an injector out, never touched the head or pan. He burns 16 gallons of low-cost Diesel fuel in 8 hours—specified GM Diesel power "because it was economical . . . and has proved to be reliable."

25% MORE WORK; FUEL COSTS ⅓ LESS

Killough Construction Company has *standardized* on GM Diesel power for their portable rock crushing plant in Kansas. The firm uses six GM Diesels to run a hammer mill, operate conveyors and screens, a primary crusher and two shovels. One shovel, converted from gasoline to GM Diesel power, now does 25% more work on one-third less fuel cost.

R.J. BOE CONST CO
EUCLID

"WONDERFUL PERFORMER"

This GM Diesel-powered scraper hauled nine yards every four minutes on a recent job for the R. J. Boe Construction Company. Contractor Russell Boe likes the "wonderful acceleration and trouble-free performance GM Diesel power gives me." He says, "All you need to do is keep water, oil and clean fuel in that GM Diesel and you'll get a good day's work out of it."

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

(Continued from page 214)

▲ **Wis., Madison**—SERVICE MEMORIAL INSTITUTE—BA 3/9—University of Wisconsin, Madison, service memorial institute addn. **$1,400,000.** Brimeyer, Grellinger & Rose, 857 N. Broadway, Milwaukee, archts. CD 1/27/54.

▲ **Wis., Eau Claire**—SCHOOL—BA 3/16—Bd. Educ., 122 Mappa St., Senior High School, $2,600,000. E. F. Klinger & Assocs., 121½ W. Grand Ave., archts. CD 3/16/54.

Wis., Fort Atkinson—FACTORY—Bids Asked—National Agricultural Supply Co., 22 N. Water St., 1 story, 150x150 ft. factory, $125,000. K. W. Fuge & Assocs., N. Main St., Fort Atkinson, archts.

SOON LETS CONTRACT—BUILDINGS

▲ **Ill., Joliet**—ACADEMY—Sisters of St. Francis Convent, 373 Western Ave., soon lets contract academy, $1,650,000. E. Brielmaier & Sons Co., 735 N. Water St., Milwaukee 2, Wis., archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **U. S. Eng., 420 Locust St., St. Louis 2, Mo.,** cancelled bids to have been opened Mar. 7, pressure relief wells, Proj. Item III-A, East Cape Girardeau and Clear Creek Drainage Dist., Alexander Co., CIVENG-23-065-55-47, ILLINOIS. CD 2/1.

Walsh Constr. Co., 140 N. Dearborn St., Chicago, Ill., LB **$139,982** operators house;

Fitz Simons & Connell Dredge & Dock Co., 10 S. La Salle St., Chicago, Ill., LB **$109,947,** dredging work at Halsted St. Bridge, CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Jan. 28. CD 1/20.

Lee Constr. Co., 127 N. Dearborn St., Chicago 2, Ill., LB, **$477,100,** field house and gymnasium, Lawndale Park, 31 and Keeler Sts., CHICAGO, ILL. Chicago Park Dist., 425 E. 14th St., Chicago 5, Ill. CD 6/11/45.

East St. Louis & Interurban Water Co., S. C. Casteel, genl. mgr., 513 Missouri Ave., East St. Louis, Ill., Own Forces. **$130,000,** laying 6,000 ft. 30 in. concrete pipe from two storage tanks in French Village to 79 St. and Route 50, French Village; Own Forces **$350,000,** laying about 10,000 ft. 36 in. water mains from main pumping plant on Front St. East St. Louis to distribution system, EAST ST. LOUIS, ILL. CD 12/20.

Chicago Bridge & Iron Wks., 332 S. Michigan Ave., Chicago, Ill., CA, 2 m.g. water storage tank, etc., in Belleville;

Bauer Bros. Constr. Co., 424 Lebanon Ave., Belleville, Ill., CA, foundations on same in Belleville, Total est. **$65,000;**

Chicago, Bridge & Iron Wks. Co., 332 S. Michigan Ave., Chicago, Ill., CA, two 2½ m.g. storage tanks; in French Village (East St. Louis P.O.);

L. M. Krause Constr. Co., Inc., Murphy Bldg., East St. Louis, Ill., CA, foundations for same in French Village (East St. Louis P.O.) Total est. **$175,000,** EAST ST. LOUIS, ILL. East St. Louis & Interurban Water Co., S. C. Castell, genl. mgr., 513 Missouri Ave., East St. Louis, Ill. CD 12/20.

† **S. J. Groves & Sons Co.,** Wesley Temple Bldg., Minneapolis, Minn., CA **$638,997,** strengthening 2 runways, ENG-11-032-55-24, SCOTT AIR FORCE BASE, ILL. U. S. Eng., 4735 Merchandise Mart, Chicago 54, Ill. Bids Jan. 25. CD 1/21.

▲ **S. A. Healy & Gargaro Co.,** 40 E. Seven Mile Rd., Detroit 3, Mich. CA **$7,927,000.** sewers, Contrs. PW-1435, PW-1436, PW-1437 and PW-1438, DETROIT, MICH. City, Dpt. P. Wks., Guardian Bldg., Detroit 26, Mich. Bids Dec. 21, awarded Jan. 18. CD 11/18.

† **Dunn Constr. Co.,** Port Huron, Mich. CA **$389,818.** control tower, alert hangar addn., Selfridge Field Air Force Base, SELFRIDGE AIR FORCE BASE, MICH. U. S. Eng., 1900 Cadillac Tower, Detroit, Mich. Bids Jan. 27. CD 1/6.

BUILDINGS

LOW BIDS AND CONTRACTS

American Machine & Foundry Co., 261 Madison Ave., New York, N. Y. CA. Est. **$500,000.** LABORATORY, to house "swimming pool" type nuclear reactor for experiments in use of atomic power to generate electricity to test chemical reactions, etc., COLUMBUS, O. Battelle Memorial Institute, 505 King Ave., Columbus, O. CD 10/13.

Ajax Constr. Co., 6319 Wiethe St., Cincinnati, O. CA Approx. **$350,000.** SCHOOL, Columbia Ave., READING, O. Our Lady of Sacred Heart, Columbia Ave. and Reading Rd., READING, O. Bids Jan. 18. CD 1/14.

Wermuth, Inc., 1036 St. Marys St., Fort Wayne, Ind., LB **$414,000,** general contract JUNIOR HIGH SCHOOL, AUBURN, IND. Bd. Educ., Auburn, Ind. Bids Jan. 27. CD 1/17.

▲ **The Fluor Corp. Ltd.,** 2500 Atlantic St., Los Angeles, Calif. CA, Total est. **$10,000,000.** nitrogen fixation unit and ammonia plant, HAMMOND, IND. Calumet Nitrogen Products Co., c/o Standard Oil Co. of Indiana and Sinclair Refining Co., 910 S. Michigan Ave. Chicago 5, Ill. Bids Jan. 10. CD 12/9.

Ray L. Tucker, Barrington, Ill. Own Forces, **$400,000.** SHOPPING CENTER, BARRINGTON, ILL. Robt. Babbin, 3744 W. North Ave., Chicago, archt.

▲ **A. L. Jackson Co.,** 300 W. Washington St., Chicago 6, Ill. CA **$2,000,000,** 21 story, 38-unit APARTMENT, 1440 Lake Shore Dr., CHICAGO, ILL. Wm. W. Allison, 229 Lake Shore Dr., Chicago 11, Ill. Awarded Feb. 1. CD 5/10.

▲ **Ridgemore Corp.,** 7 S. Dearborn St., Chicago 3, Ill., CA, **$2,500,000,** four 218-unit 5 story APARTMENTS, CHICAGO, ILL. Owner, c/o contractor, Awarded Jan. 27.

Grayco Constr. Co., 1243 S. Wabash St., Chicago, Ill., LB **$535,119,** St. Patrick's HIGH SCHOOL and GYMNASIUM, KANKAKEE, ILL. Catholic Bishop of Joliet, 16 E. Clinton St., Joliet, Ill. CD 4/25.

Preisel Constr. Co., 950 East Merchant St., Kankakee, Ill., LB **$350,000.** SHOPPING CENTER, KANKAKEE, ILL. Louis Beckman & Co., Kankakee, Ill. Bids Jan. 18. CD 1/18.

Jos. Frett & Son, 305 E. Elm St., McHenry, Ill., Own Forces, **$875,000.** 75 HOMES, McHENRY, HARVARD AND MARENGO, ILL.

H. Schmitt & Son, 930 E. Burleigh St., Milwaukee 2, Wis., CA, **$450,000,** 3 story, part bsmnt., 90x120 ft. GYMNASIUM, MILWAUKEE, Wis. St. John's Cathedral, 802 N. Jackson St., Milwaukee 2, Wis. Bids Nov. 9. CD 10/27.

E. A. Kundinger, Inc., 14837 Kercheval St., Detroit, Mich. CA Est. **$825,000.** 26 duplex HOUSES, Kelly Rd., EAST DETROIT, MICH. Kenneth W. Carter & Co., 20223 Mack St., Grosse Pointe Woods, Mich.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

Neb., Crete—POWER PLANT—BA 2/23—City, City Hall, power plant exten. being building alterations, generating equipment, electrical work. $246,920. Harold Hoskins & Assocs., 1630 Q St., Lincoln, engrs. CD 1/26.

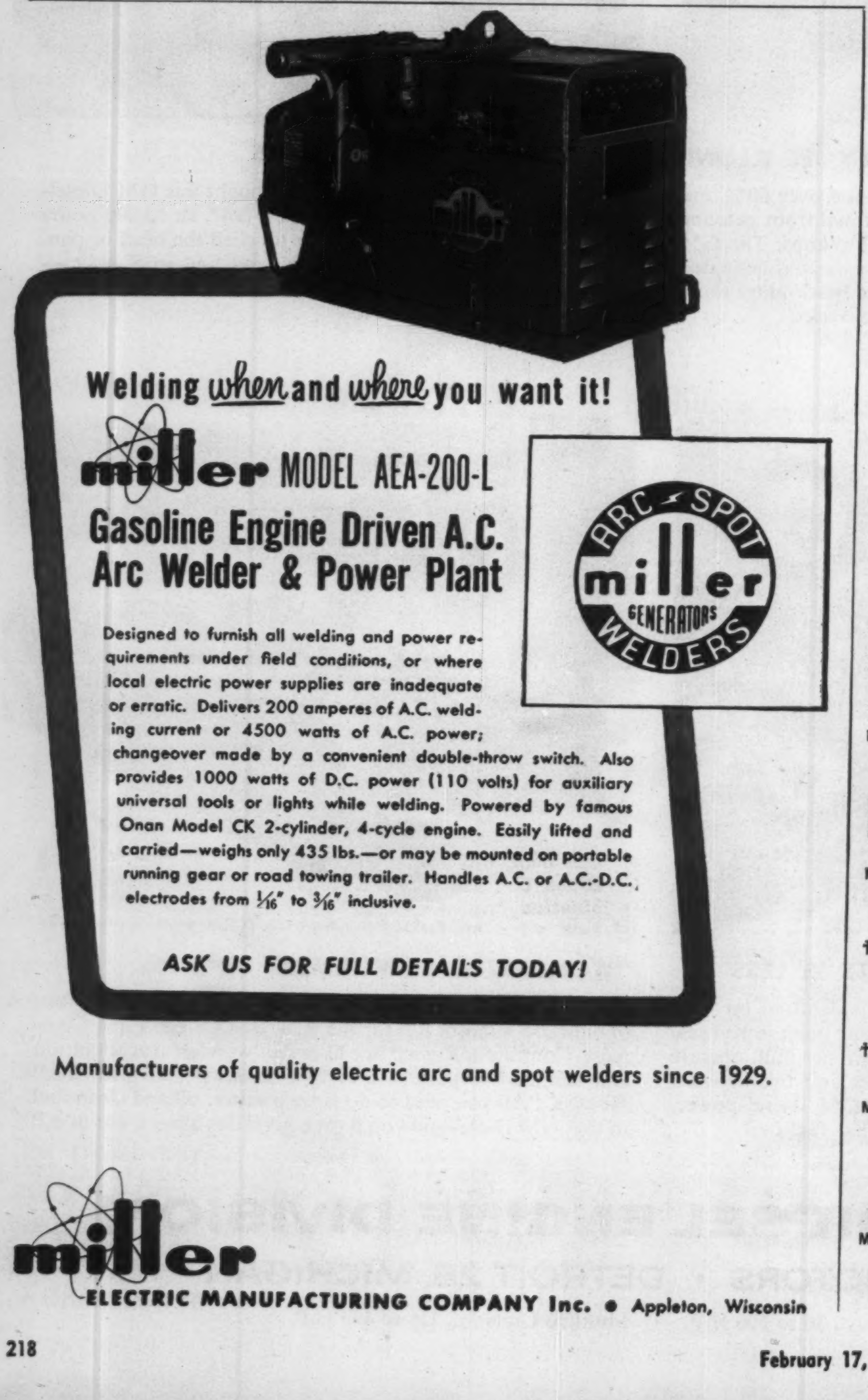
† **North Dakota**—SYNCHRONOUS CONDENSER—BA About 2/24—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., synchronous condenser with starting and control equipment for Fargo Sub-station, Transmission Div., Missouri River Basin Proj., Inv. DS-4290. Bids Jan. 13 rejected, LB **$270,950.** CD 1/24, under LB.

† **Kan., Wichita**—GYMNASIUM—BA 2/25—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., gymnasium, McConnell Air Force Base, Inv. 23-028-55-50. CD 1/28.

Minn., Fridley—BA 2/25—Village, E. Madsen, mgr., WW imprvs., 57,542 ft. 6-to-12-in. c.i. pipe, 64 hydrants and valves, one hundred sixteen 8 to 12 in. valves, three hundred fifty-seven 6 to 12-in. fittings, eight 8 to 10-in. diffierential valves, 4 valve pits, misc. fittings, 1 m.g. steel reservoir, pump station with pumps controls and piping, $480,000, Plans deposit $15. Minder Eng. Co., 6418 56 Ave. N., Minneapolis, engr.

Minn., Kimball—BA 2/28—Village, Irene Nordstrom, clk., sewerage sys., 11,000 lin. ft. 8 and 12 in. sewer pipe and 2-stage filter type sewage treatment plant, $167,900. Plans deposit $15, J. A. Lindsay, 5618 Clinton Ave., Minneapolis, engr. CD 12/22.

(Continued from page 221)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(Continued from page 218)

† **Neb., Lincoln**—WEAPONS TRAINING BLDG.—BA 3/2 U. S. Eng., 1709 Jackson St., Omaha, special weapons training bldg., Lincoln Air Force Base, Inv. 25-066-55-68. CD 1/31.

† **Okla., Altus**—SQUADRON OPERATIONS BLDG.—BA 3/3—U. S. Eng., Box 61, Tulsa, Zone 2, squadron operations bldg. addns., ENG-34-066-55-54. $100,000. CD 2/4.

† **Okla., Ardmore**—VEHICLE PARKING—BA 3/3—U. S. Eng., Box 61, Tulsa, Zone 2, vehicle parking areas, Ardmore Air Force Base, ENG-34-066-55-53. $100,000. CD 1/24/52.

Kan., Topeka—BA 3/8—City, imprv. East Side Sewage Plant, $550,000, Servis, Van Doren & Hazard, Crawford Bldg., engrs. CD 7/29.

† **North Dakota**—BA 3/15—U. S. Eng., Riverdale, construct portion of grout curtain, Sect. III B, on east abutment of the Garrison Dam, Inv. 32-015-55-41. CD 1/21.

BIDS ASKED—BUILDINGS

Kan., Topeka—SCHOOL—BA 2/23—Highland Park Rural High School Dist., high school addn. $593,000, **Griest & Ekdahl**, New England Bldg., archts. CD 7/8.

Minn., Arlington—CHURCH—BA 2/24—St. Paul's Lutheran Church, Rev. Bradgke, Arlington, 1 story, bsmnt., brick, stone church, $344,000, M. & G. Buetow, 1931 University Ave., St. Paul, archts. CD 12/10.

† **Minn., Minneapolis**—VENTILATION—BA 2/25—U. S. Eng., 1709 Jackson St., Omaha, Neb., addnl. ventilation, Bldgs. 501 and 502 Twin Cities Arsenal, Inv. 25-066-55-67. CD 11/30.

Tex., Fort Worth—CHURCH—BA 2/25—First Presbyterian Church Congregation, c/o John W. Floore, archt., 1401 W. Lancaster St., church, $350,000. Plans deposit $25. Preston M. Geren, 1607 Fort Worth Natl. Bank Bldg., assoc. archts. CD 1/11.

Minn., Richfield (Minneapolis P.O.)—SCHOOL—BA 3/1—Bd. Educ., Richfield, 1 story, 140x316 ft., Portland Grade School, Fourth Ave. South and 72 St. $500,000, Thorshov & Cerny, 400 Metropolitan Bldg. Minneapolis archts. CD 9/30.

Minn. Minneapolis—LAW SCHOOL—BA 3/2—Regents of University of Minnesota, C. A. Smith, purch. agt., Admin. Bldg., Main Campus, Law School addn. $500,000. Plans deposit $25, Magney, Tusler & Setter, 303 Roanoke Bldg., Minneapolis, archts. CD 1/27, under LB.

Minn., Storden—SCHOOL—BA About 3/3—Bd. Educ., L. A. Crist, clk., SCHOOL, $400,000, Haarstick, Lundgren & Assoc., W. 1391 First National Bank Bldg., St. Paul, archts. CD 11/29.

▲ **Kan., Wichita**—SCHOOL—BA 3/4—Bd. Educ., 428 S. Broadway, Southeast High School. $3,500,000. Forsblom & Parks, Beacon Bldg., archts. CD 7/8.

Minn., Marshall—SCHOOL—BA 3/15—Bd. Educ., Dr. M. J. Carrow, clk., grade school, Eastside Grade School, addn., shop addn. to high school, $600,000, Pass & Rockey, Mankato, archts. CD 10/29.

SOON LETS CONTRACT—BUILDINGS

Tex., Dallas—WAREHOUSE, etc.—The Shippers Warehouse & Compress Co., 2901 S. Lamar St., soon lets contract 70,000 sq. ft. hollow tile cotton warehouse and compress, incl. loading docks. $227,000. Easterwood & Easterwood, Amicable Bldg., Waco, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **H. P. Droher & Sons**, Minnesota Bldg., St. Paul, Minn. LB **$119,357**. warehouse addn., Duluth Air Force Base, Inv. 25-066-55-60, DULUTH, MINN. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 27. CD 1/12.

L. E. **Myers & Co.**, 53 W. Jackson Blvd., Chicago 4, Ill. and **Stone & Webster Engineering Co.**, 4050 Bingham Ave., St. Louis 16, Mo. **$300,000**. two new 138,000 volt transmission lines, linking Meramec plant conjunction Meramec and Mississippi Rivers, St. Louis County to MacKenzie switching station and Page Station in other areas, St. Louis Co., MISSOURI. Union Electric Co. of Missouri, 314 N. 12 Blvd., St. Louis 1, Mo. CD 1/10.

Sharp Bros. Contg. Co., 1014 E. 19 St., Kansas City, Mo. CA **$599,226**, est. $599,000. testing bldg. to house 5 engine test cells at TWA overhaul base, Mid-Continent International Airport, KANSAS CITY, MO. City, Dpt. P. Wks., City Hall, Kansas City, Mo. Bids Jan. 18, awarded Feb. 3.

Sowers Contg. Co., 1203 Beverly Rd., Independence, Mo. CA **$272,654**. sewers, force main, manholes, lift station, RICHMOND, MO. City, Richmond, Mo. Bids Jan. 25. CD 1/12.

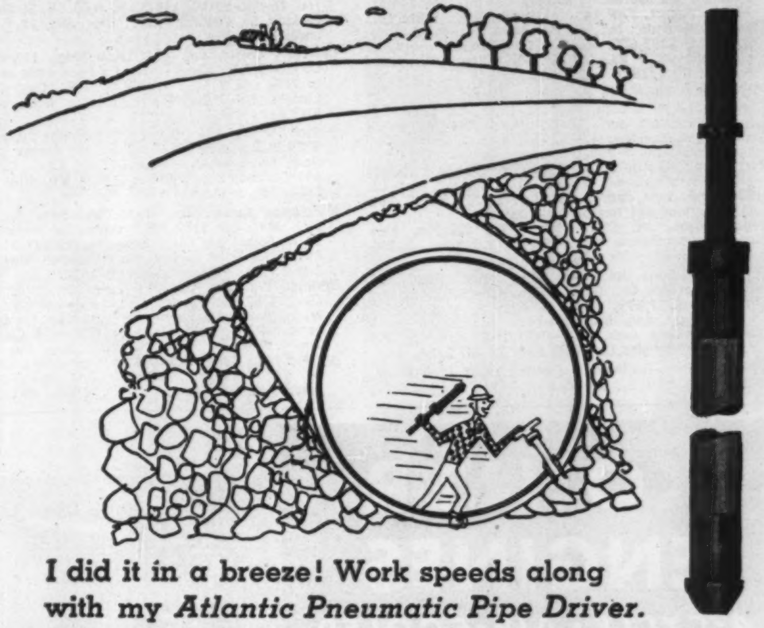
▲ **ARKANSAS**—State Hy. Dpt., Capitol, Little Rock,
Forsgren Bros., 3023 N. 23 St., Ft. Smith, Ark., CA, **$282,260**. grading, drainage, crushed stone base, 4 rein.-con. slab bridges and 1 rein.-con. structural steel overpass 10.71 mi. State Hy. 27, Dansville-Chickalah, Yell Co.;

Northwest Asphalt Co., Sulphur Springs, Ark., CA, **$191,171**, crushed limestone base, double bit., 2 rein.-con. slab bridges, 10.548 mi. State Hy. 23, St. Paul-Witter, Madison Co.;

Paul Hooper, Camden, Ark., CA, **$192,253**, grav. base, dense graded asph. hot mix surf. 10.53 mi. State Hy. 4, Harell-Warren, Calhoun and Bradley Counties;

Bucton Constr. Co., Hazen, Ark., CA, **$143,215** grading, drainage, grav. or crushed stone base, precast slab bridges 2.66 mi. State Hy. 13, Carlisle-Humnoke, Lonoke Co. Bids Feb. 2. Awarded Feb. 2. CD 1/25.

† **Branton & Hayes Co.**, 1900 Lincoln Ave., Little Rock, CA, **$280,871**, est. $306,598, base headquarters, Little Rock Air Force Base, ENG-03-050-55-77, JACKSONVILLE, ARK. U. S. Eng., P.O. Box 867, Little Rock, Ark. Bids Jan. 28, awarded Feb. 2. CD 1/6.



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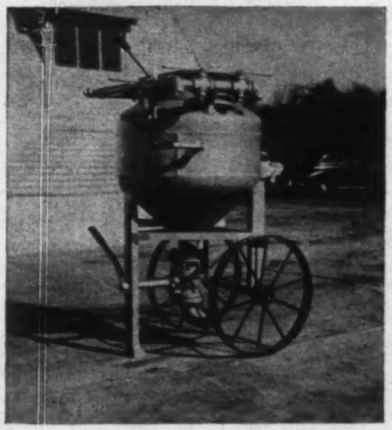

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SOUTH DAKOTA—State Hy. Comn., Pierre,
Moore Constr. Co., Rapid City, S. D., LB **$127,125**, structure and approach grading 2.433 mi., one 294 ft. I-beam viaduct, FAP 243D (pt.) (St. Wk.), Butte Co.;
Bonesteel & Hyde, Inc., 603½ Main St., Rapid City, S. D. LB **$163,605**. one 434 ft. continuous composite girder viaduct, F 231 (3) (St. Wk.), Stanley Co. Bids Feb. 1. CD 1/19.

SOUTH DAKOTA—State Hy. Comn., Pierre,
G. H. Lindekugel & Sons, Mitchell, S. D., LB **$277,855**, base course, bit. surf. 18.427 mi. F 491 (2), Butte and Meade Counties; LB **$206,174**, base course, bit. surf. 12.063 mi, F 208 (8) Roberts Co.;
Myrl Clark, Tyndall, S. D., LB **$129,467**. base course, bit. surf. 8.661 mi. F 162 (12), Haakon Co.; LB **$227,664**, base course, bit. surf. 14.211 mi. F 162 (13), Jackson and Haakon Counties;
Megarry Bros., St. Cloud, Minn., LB **$82,746**, base course strengthening and bit. surf. 9.898 mi. S 235 (7), Lyman Co. Bids Feb. 1. CD 1/19.

NEBRASKA—State Dpt. Roads & Irrigation, Lincoln,
Peter Kiewit Sons Co., Omaha Natl. Bank Bldg., Omaha, Neb., LB **$367,099**, Omaha Outer Drive, grading, paving, culvert, seed, bridge, viaduct approaches, guard rail, rock and asph., FA—S-438; SG-438 (3) and FA-U-512, Douglas Co. Bids Feb. 3. CD 1/26.

▲† **Abel-Dobson-Robinson**, a combination of Abel Constr. Co., 1815 "Y" St. and Dobson & Robinson, 823 1st Natl. Bank Bldg., Lincoln, Neb., CA **$1,198,868**. parking apron and access taxiway, Lincoln Air Force Base, Inv. 25-066-55-49, LINCOLN, NEB. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 27. CD 2/1, under LB.

Chambers Constr. Co., 621 Trust Bldg., Lincoln, Neb., LB **$345,968**, water feed main from 40th and A Sts. to 70th and O Sts., LINCOLN, NEB. City, City Hall, Lincoln, Neb. Carl Fisher, Lincoln, Neb., city engr. Bids Feb. 2.

† **Geo. Sheaf & Co.**, 20 W. 9 St., Kansas City, Mo. LB **$329,363**. operation bldg., etc. at Forbes Air Force Base, Inv. 23-028-55-42, TOPEKA, KAN. U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Jan. 27. CD 12/30.

† **Bushman Constr. Co.**, 4635 Wyandotte St., Kansas City, Mo. LB **$152,795**. calibration hardstand FY-55 at Forbes Air Force Base, Inv. 23-028-55-46, TOPEKA, KAN. U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Jan. 27. CD 1/12.

Davidson Plumbing Co., 301 Laura St., Wichita, Kan. LB **$225,396**. pneumatic compressor installation, WICHITA, KAN. Boeing Airplane Co., Plant No. II, Personnel Bldg., Wichita, Kan. Wilson & Co., 705 E. Crawford St., Salina, Kan., engrs. Bids Jan. 26.

▲† **McCarthy Imprvt. Co.**, 602 Kahl Bldg., Davenport, Ia., CA **$1,995,841**, airfield paving, Vance Air Force Base, Inv. ENG-34-066-55-37, ENID, OKLA. U. S. Eng., Box 61, Tulsa 2, Okla. Bids Jan. 28. CD 2/7, under LB.

† **McKenzie & Whittle Constr. Co.**, 4007 Irving Blvd., Dallas, Tex., LB **$447,409**, est. $386,442, constr. Turtle Creek Pressure Sewer, Part III, Dallas Floodway, CIVENG-41-443-55-29, TEXAS. U. S. Eng., 100 W. Vickery Blvd., Fort Worth, Tex. Bids Feb. 4. CD 1/11.

† **V & N Constr. Co.**, P. O. Box 834, Lubbock, Tex., LB **$209,551**, ordnance storage area facilities, Abilene Air Force Base, ENG-41-443-55-50, ABILENE, TEX. U. S. Eng., 100 W. Vickery Blvd., Fort Worth, Tex. Bids Feb. 4.

Cameron Co., Court House, Brownsville, Tex. Own Forces. road constr., imprvs., rehabilitation and surf., **$110,000**, Precinct 1; **$95,500**, Precinct 2; **$105,000**, Precinct 3; **$125,000**, Precinct 4, BROWNSVILLE, TEX. Grand total $435,000. James C. Harris, c/o owner, engr. CD 1/3.

C. H. Burns & Son, 7935 Hume Dr., Dallas, Tex., CA **$128,313**, sanitary and storm sewers, CARROLLTON, TEX. River Oaks Corp., Carrollton, Tex. CD 12/22.

† **Robert M. McKee, General Contractor, Inc.**, Drawer 562, El Paso, Tex., LB **$269,600**. technical training bldg., Biggs Air Force Base, Serial No. ENG-29-005-55-47, EL PASO, TEX. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Jan. 28. CD 1/19.

Cloer Constr. Co., 3707 S. Hills Ave., Fort Worth, Tex. CA **$124,114**, storm and sanitary sewers, FORT WORTH, TEX. E. E. Cloer, 200 Burnett St., Fort Worth, Tex. CD 12/8.

Lee & McKnight, 7220 Canal St., Houston, Tex., LB **$143,327**, est. $140,000. sanitary sewers Ryon Addn., HOUSTON, TEX. City, City Hall, Houston, Tex. Still, Wildman & Crockett, 3030 Louisiana St., Houston, Tex. engrs. Bids Jan. 28.

J. D. George Co., 1207 Amicable Bldg., Waco, Tex., LB **$164,089**. Webster Street Interceptor Sewer, WACO, TEX. City, Waco, Tex. Eugene R. Shields, city engr. Bids Jan. 28.

WYOMING—State Hy. Comn., Cheyenne,
Charles M. Smith, Thermopolis, Wyo., CA **$113,097**, est. $116,622. 1 four continuous plate girder span bridge over Big Horn River, Lovell-Burgess Jct. Rd., State Proj. 3831, Big Horn Co. Bids Feb. 4.

WYOMING—State Hy. Comn., Cheyenne,
Etlin E. Peterson, Casper, Wyo., CA **$170,401**, est. $183,343, base course surf., double surface tr. constr. 1 bridge over North Platte River 1.553 mi. Rawlins-Medicine Bow Road, Proj. IN-221 (11), Carbon Co.;
Lichty Constr. Co., Casper, Wyo., CA **$154,873**, est. $147,467 select material surf., one bridge, one culvert 5.414 mi. Brooks-Hat Six Road, Proj. S-93 (1), Natrona Co. Bids Feb. 4.

COLORADO—State Hy. Dpt., 518 State Office Bldg., Denver,
Western Paving Constr. Co., 5105 North Washington St., Denver, Colo., LB, **$744,690**, est. $741,637. grading, stab., structures, asph. surf. 6.987 mi. State Hy. No. 3, Colo. Proj. F 006-1 (12), Weld Co. Bids Feb. 1. CD 1/19.

BUILDINGS

BIDS ASKED—BUILDINGS

▲ **Johnson, Drake & Piper**, 1138 Baker Bldg., Minneapolis, Minn. LB **$7,048,000**. South Dale SHOPPING CENTER, EDINA-RICHFIELD, MINN. The Dayton Co., Seventh St. and Nicollet Ave., and L. S. Donaldson Co., 601 Nicollet Ave., Minneapolis, Minn. CD 12/22/54.

▲ **The Lummus Co.**, 385 Madison Ave., New York 17, N. Y. CA **$15,000,000**. design and construct AMMONIA PLANT, Pine Bend area, Dakota Co., near HASTINGS, MINN. St. Paul Ammonia Products Co., R. Campbell, acting pres., c/o contractor.

Home Materials Co., 101 7 Ave. S.E., Cedar Rapids, Ia., Owner Builds. **$800,000**. 90 factory built HOUSES, CEDAR RAPIDS, IA.

▲ **Priester Constr. Co.**, 1117 Davison Bank Bldg., Davenport, Ia., CA **$1,034,524** plus **$11,558** for aluminum exterior, general contract COURT HOUSE, DAVENPORT, IA. Scott Co., Court House Davenport, Ia. Bids Jan. 20. CD 12/14.

Vescovo Constr. Co., 9620 Gravois Ave., Affton 23, Mo. Owner Builds. **$423,676**. fifty-four 1 story, 24:37 ft., frame DWELLINGS, Congo Dr. and Arvin Tiger Dr., AFFTON (ST. LOUIS 23 P.O.), MO.

Morris Hoffman Contg. Co., 1523 Broadway, Kansas City, Mo., CA Approx. **$350,000**. DELIVERY DEPOT incl. storage, shop and offices, KANSAS CITY, MO. Merchants Delivery Co., 1710 Washington St., Kansas City, Mo. Manuel Morris, Railway Exchange Bldg. Kansas City, Mo. archt. Bids Jan. 22.

Bob Eldridge Constr. Co., 3206 Strong St., Kansas City, Kan. CA **$560,897**. general contract West Junior High School, KANSAS CITY, KAN. Bd. Educ., Library Bldg., Kansas City, Kan. Bids Jan. 25. CD 1/9.

▲ **Elmdale Development Co.**, Beacon Bldg., Wichita, Kan. Owner Builds. **$1,750,000**. HOUSING, WICHITA, KAN. L. E. Wells, 738 N. Waco St., Wichita, Kan., archt.

River Oaks Corp., Carrollton, Tex., Owner Builds. **$365,110**, 36 DWELLINGS; **$380,000**, 38 DWELLINGS, CARROLLTON, TEX. CD 12/3.

Cato Corp., c/o C. Grady Cates, Jr., 9747 Harry Hines Blvd., Dallas, Tex. Owner Builds. **$375,000** (E) 40 DWELLINGS; **$366,115** (F) 27 DWELLINGS, FARMERS BRANCH, TEX. CD 12/9.

Cadenhead & Rosser, 4776 Trail Lake Dr., Fort Worth, Tex., LB **$540,000**. STORE and MARKET, Wichita St., FORT WORTH, TEX. Safeway Stores, Inc.,

(Continued on page 224)

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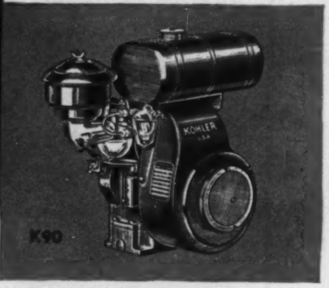

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K160.........**3.6 to 6.6 H.P.**
K330............**7 to 12 H.P.**
K660 (2 cylinder opposed) **12 to 26 H.P.**

KOHLER
K160

Modern design, air-cooled Kohler Engines in sizes from 2.5 to 26 H.P. offer a power range to fit all applications requiring a reliable and economical power source.

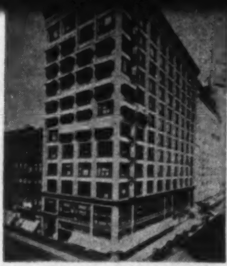
Kohler branch offices are located in sixteen principal cities. Sales and service distributors, throughout the country, have parts available, are ready to assist you in selecting a Kohler Engine best suited for your requirements. Write for information.

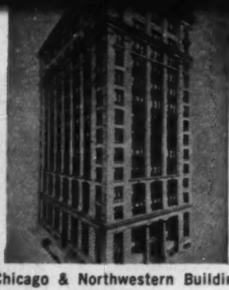
KOHLER U.S.A.
K330
K660
KOHLER

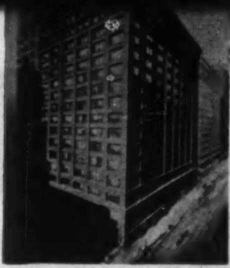
High-voltage magneto insures quick, all-weather starting. Efficient cooling at all operating temperatures and speeds.

Kohler Co., Kohler, Wisconsin • Established 1873
KOHLER OF KOHLER
PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

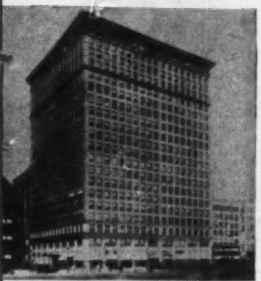
Tacoma Building
1886


Champlain Building
1894


Chicago & Northwestern Building
1905


Marquette Building
1906

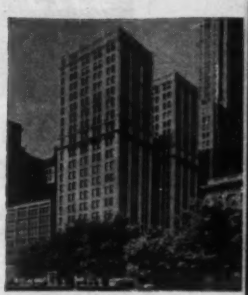
Blackstone Hotel
1910


McCormick Building
1911

Monroe Building
1912

Hearst Building
1912

Otis Building
1913


Michigan Boulevard
Building–1917

Conrad Hilton Hotel–1928

FULLER'S CHICAGO

The George A. Fuller Company has played a leading role in the building of a greater Chicago and we are proud to show representative work here along with the new Prudential Mid-America Home Office now occupying an important place on that famous skyline.

But the Fuller story can be repeated in almost any other major American city. For instance, 77 jobs in Boston; 33 in Detroit; 15 in Kansas City; 307 in New York City; 56 in Philadelphia; 8 in San Francisco; 181 in Washington, D. C.

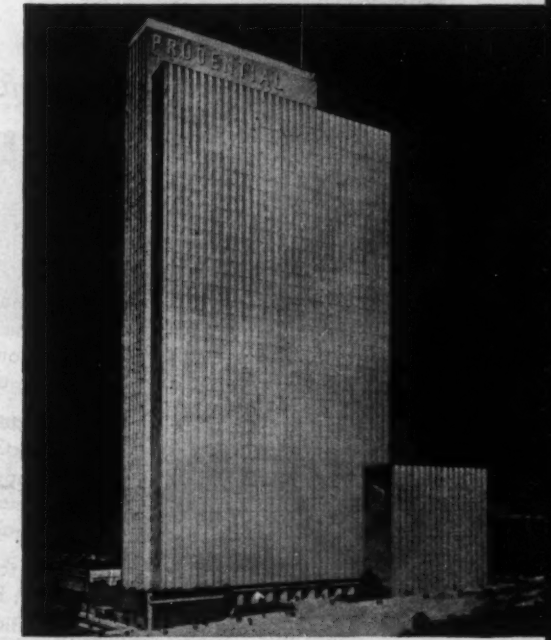
Fuller's offices in New York, Atlanta, Boston, Chicago, Dallas, Pittsburgh, Los Angeles and Washington stand ready to serve your building needs.

THE PRUDENTIAL BUILDING.

Passavant Hospital
1930

Marshall Field Building
1936

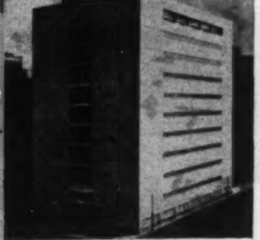
Wesley Hospital
1942



THE PRUDENTIAL INSURANCE COMPANY OF AMERICA
Mid-America Home Office
Naess and Murphy, Architects-Engineers

Bonwit Teller Store–1944

Dodge Chicago Plant–1945


Illinois Bell Telephone
Building–1949

Evergreen Park Shopping Plaza
1953

Sign of leadership in building construction

**GEORGE A. FULLER
COMPANY
BUILDING CONSTRUCTION**

Greatest buy in HEAT

300,000 BTU's

$325 ELECTRIC DRIVE

$350 GASOLINE ENGINE DRIVE

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for CONTRACTORS, INDUSTRIAL PLANTS, FARMERS, ROAD BUILDERS

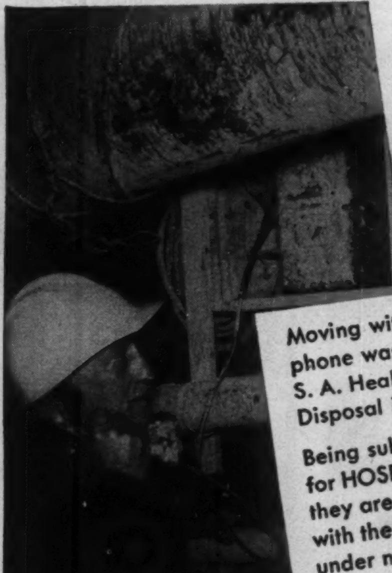
Compact, portable, safe and efficient, the oil fired Clayton Salamander supplies clean, odorless hot air at high velocity . . . at the rate of 2400 cu. ft. per minute . . . for heating space, drying out new construction, thawing frozen ground, aggregates and equipment, removing snow and preventing the freezing of wet concrete while curing. Hundreds of other uses.

Made in two models of identical capacity, 300,000 BTU's per hour. Gasoline engine drive for 100% portability and remote use; electric drive for general utility. Burns less than 2¼ gals. kerosene or stove oil per hour. Made by Clayton Manufacturing Company, leaders in combustion engineering and building of package type steam generators. Write for complete literature.

SPACE HEATING
•
PAVING CURING
•
SNOW REMOVAL
•
MATERIALS AND GROUND THAWING
•
PAINT DRYING

CLAYTON MANUFACTURING CO.
BOX 550, EL MONTE, CALIF.

SOME TERRITORIES OPEN FOR EQUIPMENT DISTRIBUTORS



Tho' CAKED WITH CONCRETE this phone never failed

Moving with the job as it progressed, this phone was one of a series used by the S. A. Healy Company on the Bowery Bay Sewerage Disposal job, almost five miles long.

Being subjected to such hardships is nothing new for HOSE-McCANN Sound Powered Telephones for they are made to operate just about everywhere with the same dependable service . . . under normal conditions or in any emergency.

NEED NO CURRENT Activated by the sound energy of the voice, these phones operate at all times without batteries or other outside sources of current. For permanent installation on industrial projects or for temporary use on construction jobs, HOSE-McCANN Phones offer trouble-free performance with a minimum of upkeep.

INDOOR OR OUTDOOR MODELS
Available in selective or common ringing and semi-selective or common talking.

Write for illustrated catalog

HOSE-McCANN
TELEPHONE CO., INC.
761 THIRD AVENUE
BROOKLYN 32, N. Y.

(Continued from page 222)

Electric Bldg., Fort Worth, Tex. and Bramwell Const Co. (Div. of Safeway Stores), 318 Cadiz St., Dallas, Tex. Bids Jan. 25. CD 11/26.

▲ **Cloer Constr. Co.**, 3707 S. Hills Ave., Fort Worth, Tex., CA **$1,059,110**, Group 1, 35 DWELLINGS; Group 2, 37 DWELLINGS; Group 3, 40 DWELLINGS, FORT WORTH, TEX. E. E. Cloer, 200 Burnett St., Fort Worth, Tex. CD 12/8.

▲ **Thomas S. Byrne, Inc.**, Fort Worth Natl. Bank Bldg., Fort Worth, Tex., CA **$1,000,000.** 3 story OFFICE, FORT WORTH, TEX. Chicago Corp., Earl Baldridge, pres., Continental Life Bldg., Fort Worth, Tex. MacKie & Kamrath, 2713 Ferndale St., Houston, Tex. archts. Walter P. Moore, 2 Pinedale St., R. L. Jenkins, 4316 Blossom St., Houston, Tex. consult. engrs.

Arrington-Bradley Building Co., 7445 Park Pl. Blvd., Houston, Tex., CA **$670,506**, Unit 1, 16 DWELLINGS; Unit 2, 10 DWELLINGS, HOUSTON, TEX. Glenbrook Oaks Development Co., 7445 Park Place Blvd.,, Houston, Tex. CD 11/30.

Krumnow Constr. Corp., 3929 Villanova St., Houston, Tex. Owner Builds. **$694,500**, 68 DWELLINGS near HOUSTON, TEX. CD 11/22.

Brown & Daniels Constr. Co., 10604 Harry Hines Blvd., Dallas, Tex., CA **$363,000**, Unit 1, 40 DWELLINGS, IRVING, TEX. R. F. Daniels & Assocs., 10604 Harry Hines Blvd., Dallas, Tex. CD 2/2.

▲ **M. W. Kellogg Co.**, Mellie Esperson Bldg., Houston, Tex., CA **$550,000.** converting existing catalytic crude units to charge sweet crude; CA **$425,000**, 160,000 gpm water cooling tower;

Arthur G. McKee & Co., 2300 Chester Ave. N, Cleveland 1, O., CA **$65,000**, water sys.; CA **$67,000**, general plants area grading, earthwork, filling, leveling; CA **$85,000**, plant area lighting sys. for PLANTS, PORT ARTHUR, TEX. Grand total $1,192,000. Gulf Oil Corp., Port Arthur, Tex. CD 1/28.

Jaffe & Martin Constr. Co., 4623 Blanco Rd., San Antonio, Tex., CA **$367,000.** 25 DWELLINGS; CA **$355,000** 29 DWELLINGS, SAN ANTONIO, TEX. Jaffe & Martin, 4623 Blanco Rd., San Antonio, Tex. CD 2/2.

G. W. Mitchell, 811 American Hospital & Life Bldg., San Antonio, Tex., LB **$597,000.** mens masonry GYMNASIUM, 4,250 seating capacity, etc., SAN MARCOS, TEX. Southwest Texas State Teachers College, San Marcos, Tex. Bids Feb. 1. CD 1/4.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Calif., Muroc**—FIRE STATIONS—BA 2/28—U. S. Eng., 751 S. Figueroa St., Los Angeles, Fire Stations 5 and 7 and Rawisonde facilities, Edwards Air Force Base, ENG-04-353-55-78, $350,000. Extended date. CD 1/17.

Oregon—TELEPHONE LINES—BA 2/28—Midstate Electric Co-operative, LaPine, 149.88 mi. telephone line, Lake Co. Plans deposit $10. Robert Welty, Box 282, The Dalles, engr. CD 2/1.

▲† **California**—BA 3/3—U. S. Eng., 751 S. Figueroa St., Los Angeles, Eaton Wash Channel, Encinita Ave. to Rio Hondo Channel, Rosemead, Los Angeles Co., CIVENG-04-353-55-26, $2,000,000. CD 10/13.

Calif., Los Angeles—BA 3/4—Los Angeles County Flood Control Dist., 2250 Alcazar St., Proj. 101, Wentwood St. Storm Drain, Sunland. $300,000. H. E. Hedger, c/o owner, engr. CD 11/7/52.

▲† **California**—BA 3/8—U. S. Eng., 751 S. Figueroa St., Los Angeles, Arcadia Wash. Channel, Huntington Pl. to Rio Hondo Channel, Arcadia, Los Angeles Co., CIVENG-04-353-55-28, $1,500,000. CD 10/13.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

ARIZONA—State Hy. Dpt., 17 Ave. and Jackson St., Phoenix,

Phoenix-Tempe Stone Co., Box 1670, Phoenix, Ariz., CA, **$319,022**, surf., asph. coating 17¾ mi. Cordes Jct.-Flagstaff Hy., Yavapai Co.;

Isbell Constr. Co., Box 958, Phoenix, Ariz., CA, **$283,147** select material, aggregate base, bit. road mix 3 uphill bays, Salt River Canyon passing bays, Pinal Co. Awarded Feb. 1. CD 6/12/52.

ARIZONA—State Hy. Dpt., 17 Ave. and Jackson St., Phoenix,

Dale D. Payne, 2345 W. Palm Lane, Phoenix, Ariz., LB, **$226,799**, bit. surf. 6.4 mi. Payson Beeline Hy., Maricopa Co. CD 6/12/52.

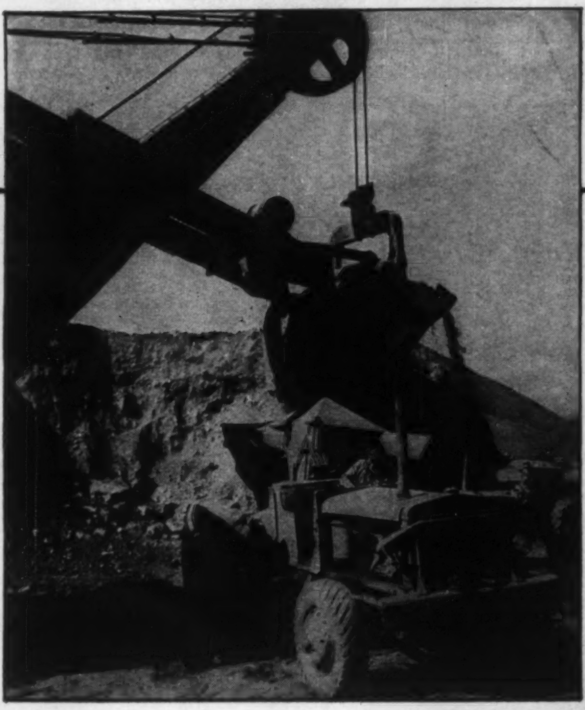
† **H. C. Werner, George W. Lewis & Tauf Charneski**, Eugene, Ore., LB **$366,043**, est. $436,074, earthwork, structures, lateral W-20, Station 428 plus 50 to station 792 plus 30, West Canal Laterals, Block 89, Columbia Basin Proj., Spec. DC 4312, WASHINGTON, Bureau Reclamation, Dpt. Interior, Ephrata, Wash. Bids Feb. 1. CD 12/17.

American Pipe & Constr. Co., 518 N.E. Columbia Blvd. Portland, Ore., CA, **$268,550**, 25,000 ft. 20 and 36 in. steel pipe for water project, ANACORTES, WASH. City, City Hall, Anacortes, Wash. Bids Feb. 1. CD 1/21.

† **Wayne Constr. Co.**, 3810 Stone Way, Seattle 3, Wash. LB, **$153,222** compartmentation and equipment snstallation at Ault Field, N06-84786, WHIDBEY ISLAND, WASH. P.Wks. Officer, Thirteenth Naval Dist., 1611 W. Wheeler St., Seattle, Wash. Bids Feb. 4. CD 1/21.

† **Stolte, Inc.**, 5467 San Fernando Rd., Los Angeles, Calif., CA **$636,948**, est. $750,000 tactical and administrative facilities, Los Angeles, ENG-04-353-55-79, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 27.

(Continued on page 226)



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CONSTRUCTION BONDS

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4 Albany Street, New York

one of America's foremost fidelity and surety companies

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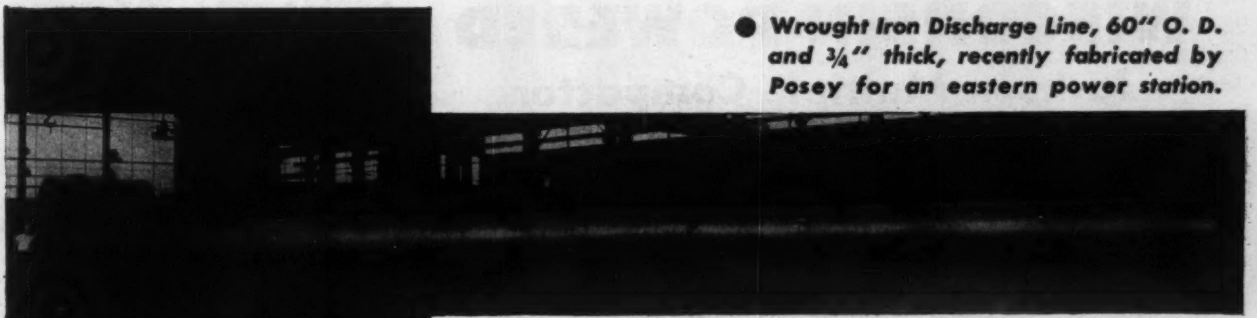
INVISIBLE ARMOR®

This symbol on your bond or policy guarantees satisfaction.



● ***Wrought Iron Discharge Line, 60" O. D. and ¾" thick, recently fabricated by Posey for an eastern power station.***

SEE POSEY

For Large O. D. WROUGHT IRON PIPE

For Sewage Outfall Lines, Water Intake Lines and Other Specialized Requirements

You can depend on Posey to meet your requirements in large O. D. wrought iron pipe . . . and you can depend on Posey to turn out your job economically and on time.

- *Posey Wrought Iron Pipe is fabricated from plates conforming with ASTM Specifications, Class A 42-52 T.*
- *Posey specializes in large O. D. Pipe and Pilings of wrought iron, carbon steel, low and high alloy steel and alloy clad steel.*

ELEVATED TANKS ● HORIZONTAL TANKS ● STACKS
PRESSURE VESSELS ● DIGESTERS
CARBON STEEL AND ALLOY STEEL PLATE FABRICATION

POSEY IRON WORKS, INC.

Steel Plate Division **Lancaster, Penna.**
New York Office: Graybar Bldg. **Established Since 1910**

(Continued from page 224)

▲ **J. A. Thompson & Son**, 8330 Hindry Ave., Los Angeles, Calif., CA **$2,000,000**, excavate, grade, paving the Doheny Ranch Subdivision, BEVERLY HILLS, CALIF. Truesdale Constr. Co., 650 N. Sepulveda Blvd., Los Angeles, Calif.

Peter Kiewit Sons Co., 345 Kieways Ave., Arcadia, Calif., CA **$545,798**, imprv. Terminal Island Sewage Treatment Plant, LOS ANGELES, CALIF., City, City Hall, Los Angeles, Calif. Bids Jan. 5. CD 1/11, under LB.

† **Consolidated Western Steel Corp.**, 5700 S. Eastern Ave., Los Angeles, Calif., CA **$637,209**, bulk depot, utilities, water storage tank, Petroleum Storage Depot, Tank Farms No. 1 and 2, ENG-04-353-55-57, NORWALK, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 21. Awarded Jan. 27. CD 1/7.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Peterson-LaPierre Enterprises**, Times Square, Seattle 1, Wash., Day Labor, **$8,000,000**. 800 HOUSES with utilities, Mountlake Terrace, SEATTLE, WASH. CD 7/23.

George Buckler Co., 4235 S. E. 17 St., Portland, Ore., CA **$771,756**, 5 story, 72-bed HOSPITAL WING, PORTLAND, ORE. Holladay Park Hospital, 1132 N.E. 2nd St., Portland, Ore. Bids Dec. 23, awarded Feb. 2. CD 1/3, under LB.

Rex Constr. Co., Box 591, Anaheim, Calif., CA, **$543,568**, est. $350,000, East Vermont, Palm Lane and West Las Palmas SCHOOLS, ANAHEIM, CALIF. Anaheim Elementary School Dist., Anaheim, Calif. Bids Feb. 1. CD 1/19.

C. L. Peck & Millie & Severson, 816 W. 5 St., Los Angeles, Calif., CA, **$750,000**. Lucerne Milk PLANT, E. Slauson, BELL, CALIF. Preston Constr. Co., Div. of Safeway Stores Inc., 575 Mission St., San Francisco 5, Calif.

▲ **Shaw Constr. Co.**, 14328 Valley View, La Mirada, Calif., Owner Builds, **$1,342,800**, 138 stucco DWELLINGS, San Alda, Badajoz, Jalon and Lorne Sts., BELLFLOWER, CALIF.

United Constr. Co., 3839 Riverside Blvd., Sacramento, Calif., CA, **$346,399**. Washington Elementary SCHOOL, BRODERICK, CALIF. Washington Elementary School Dist., P.O. Box 318, West Sacramento, Calif. Bids Jan. 18.

C. L. Peck & Millie & Severson, 816 W. 5 St., Los Angeles, Calif., CA **$360,000** tilt-up ice cream PLANT, Boxford Ave., EAST LOS ANGELES, CALIF. Preston Constr. Co. Div. of Safeway Stores, 575 Mission St., San Francisco 5, Calif.

▲ **Jacmar Groves**, Box 8115, Long Beach, Calif., CA, **$1,081,700**, 129 frame, stucco DWELLINGS, Allerd and Deerford Sts., LAKEWOOD, CALIF. Walt Constr. Co., Gorda Constr. Co. and Carmona Constr. Co., Box 8115, Long Beach, Calif. Paul J. Duncan, 13310 Moorpark St., Sherman Oaks, Calif., archt.

▲ **Jacmar Groves, Inc.**, Box 8115, Long Beach, Calif., CA, **$2,317,200**, 283 frame, stucco dwellings, Desboyer Ave. and Loomis Sts., etc. LAKEWOOD, CALIF. Bengdar Constr. Co., Calorus Constr. Co., Mayview Constr. Co., Box 8115, Long Beach, Calif. Paul J. Duncan, 13310 Moorpark St., Sherman Oaks, Calif., archt.

T. P. Schultz, Jr., 522 E. Weber Ave., Compton, Calif., LB, **$417,800**, Doty Ave. SCHOOL, LAWNDALE, CALIF. Lawndale School Dist., 14905 Hawthorne Blvd., Lawndale, Calif. Bids Jan. 27.

▲ **C. L. Peck**, 816 W. 5 St., Los Angeles, Calif., CA, **$1,750,000** 3 story rein.-con. OFFICE, LOS ANGELES, CALIF. Capitol Records, Inc., 1507 N. Vine St., Los Angeles, Calif. Welton Beckett & Assocs., 5657 Wilshire Blvd., Los Angeles, Calif., archts.

William Siegelman, 443½ S. Robertson Blvd., Beverly Hills, CA **$450,000**, 3 story, frame, stucco APARTMENT, 111 Marquez Ave., LOS ANGELES, CALIF. Pacific Gardens, Inc., 443½ S. Robertson Blvd., Beverly Hills, Calif. Gilbert A. Griffin, 1113 S. Robertson Blvd., Los Angeles, Calif., archt.

Schneider Development Co., 201 S. Pomona St., Fullerton, Calif., CA, **$355,200**, 60 frame, stucco DWELLINGS, Gilwood and Cambray Sts., PUENTE, CALIF. Sierra Vista Homes, Inc., 620 Vance St., Santa Ana, Calif.

M & K Corp., Financial Center Bldg., San Francisco, Calif., LB, **$515,515**, general contract OFFICE, Div. Hys., Dist. X, STOCKTON, CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif.

Wm. Simpson Constr. Co., 816 W. 5 St., Los Angeles, Calif., CA, **$640,000**, 3 story, brick OFFICE, 1651 N. McCaddon Pl., LOS ANGELES, CALIF. Max Factor & Co., 1666 N. Highland Ave., Los Angeles, Calif. Albert C. Martin & Assocs., 333 S. Beaudry St., Los Angeles, Calif., archts.

Wm. J. Moran Co., 1011 S. Fremont St., Alhambra, Calif., CA, **$350,000**, 2 story, rein.-con. OFFICE WAREHOUSE 8487 W. 3 St., LOS ANGELES, CALIF. Mode O'Day Corp., 155 W. Washington Blvd., Los Angeles, Calif. CD 5/26.

Zurich General Accident & Liability Insurance Co., 3576 Wilshire Blvd., Los Angeles, Calif. Owner Builds, **$640,000**, 6 story, rein.-con. OFFICE, LOS ANGELES, CALIF. Alfred T. Gilman, 11620 Barrington Court, Los Angeles, archt.

J. W. Bailey Constr. Co., 630 Santa Barbara St., Santa Barbara, Calif., LB, **$661,260**, JAIL, POLICE STATION and CITY-COUNTY OFFICE, OXNARD, CALIF. Ventura Co., Court House, and City, City Hall, Oxnard, Calif. Bids Jan. 25. CD 1/10.

▲ **Swinerton & Walberg**, 225 Bush St., San Francisco, Calif., CA, **$1,709,916**, remodeling north wing of Ferry Bldg. for WORLD TRADE CENTER SAN FRANCISCO, CALIF. State Harbor Comn., Ferry Bldg., San Francisco, Calif. Awarded Feb. 1. CD 2/2, under LB.

Tommy No. 1 Inc., 1228 S. Flower St., Los Angeles, Calif. Owner Builds, **$789,400**, 74 frame, stucco DWELLINGS, Tract 16115, WEST COVINA, CALIF.

Kemp Brothers, 8750 Mettler Ave., Los Angeles, Calif., CA, **$337,700**, 2 story, rein-con., 23,000 sq. ft. RESIDENCE HALL, WHITTIER, CALIF. Whittier College, 505 Philadelphia St., Whittier, Calif. Bids Nov. 18. CD 1/27, under LB.

CANADA

BIDS ASKED—BUILDINGS

Ont., Chatham—FACTORY—BA 2/22—**International Harvester Co. of Canada**, Sherman Ave. N., Hamilton, 1 story, 176x352 ft., rein.-con., steel, brick factory addn. $600,000. CD 12/6.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Simkin's Constr. Co., Andrews and Jarvis Sts., Winnipeg, Man. CA, **$629,384**, paving various streets, WEST KILDONAN, MAN. Municipality, West Kildonan, Man. Awarded Jan. 31.

▲ **Canadian General Electric Ltd.**, 212 King St. W., Toronto, Ont. and **Canadian Westinghouse Ltd.**, 355 King St. W., Toronto, Ont., CA **$13,600,000**, generators on St. Lawrence Seaway Proj., ONTARIO. Hydro-Electric Power Comn. of Ontario, 620 University Ave., Toronto 2, Ont.

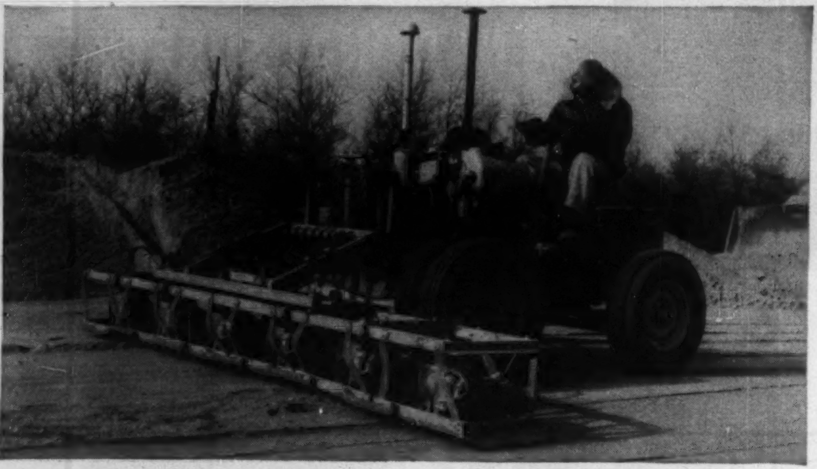
BUILDINGS

LOW BIDS AND CONTRACTS

F. J. Shouldice Constr. Co., 439 Picadilly Ave., Ottawa, Ont. CA, **$500,000**, 6 story OFFICE, O'Connor St. between Slater and Laurier Ave. W., OTTAWA, ONT. Empire Realty Co. Ltd., 227 Laurier Ave. W., Ottawa, Ont. W. C. Sproule, 74 Sparks St., Ottawa, Ont., archt.

Z. Laviguer Ltd., 8850 St. Lawrence Blvd., Montreal, Que., LB, **$505,958**, 3 story, bsmnt., rein.-con. SCHOOL, Cartier St. at Tillemont St., MONTREAL, QUE. Catholic School Comn., 117 St. Catherine St. W., Montreal, Que. Bids Feb. 1. CD 1/20.

▲ **S. N. Lazarus & Co.**, 1819 Glendale Ave., Montreal, Que., CA, **$3,500,000**. HOUSING DEVELOPMENT, Gentilly Road Ville Jacques Cartier, MONTREAL, QUE. Harmony Homes, Inc., c/o contractor. R. Fisher, 3177 St. Sulpice Rd., Montreal, Que., archt.



WISCONSIN-POWERED
Jackson Multiple Compactor
Achieves 98% Sand Compaction
on Garden State Parkway Project

When the Reid Contracting Co., of Woodbridge, N. J., was awarded the contract comprising grading and drainage from Route 9 interchange, north of Toms River to the S. Matedeconk River (Garden State Parkway, Sec. 8), one of the essential pieces of equipment required for the job was the Wisconsin-Powered Jackson Multiple Compactor, illustrated above.

The picture shows the vibrator compacting the sand fill enclosed by the abutment and wing walls of the bridge that will carry the Parkway over the Indian Head Road. Specifications called for laying down the sand in 12" layers, with 98% compaction in the top 4' of depth and 90% below. Tests by supervising engineers show that these requirements were met.

This is a typical assignment which, among other things, demonstrates the complete adaptability and heavy-duty serviceability of Wisconsin Heavy-Duty Air-Cooled Engines to Fit the Machine and the Job. These engines are used as standard power components on a great variety of construction machinery requiring power in a 3 to 36 hp. range . . . 4-cycle single cylinder, 2- and 4-cylinder models.

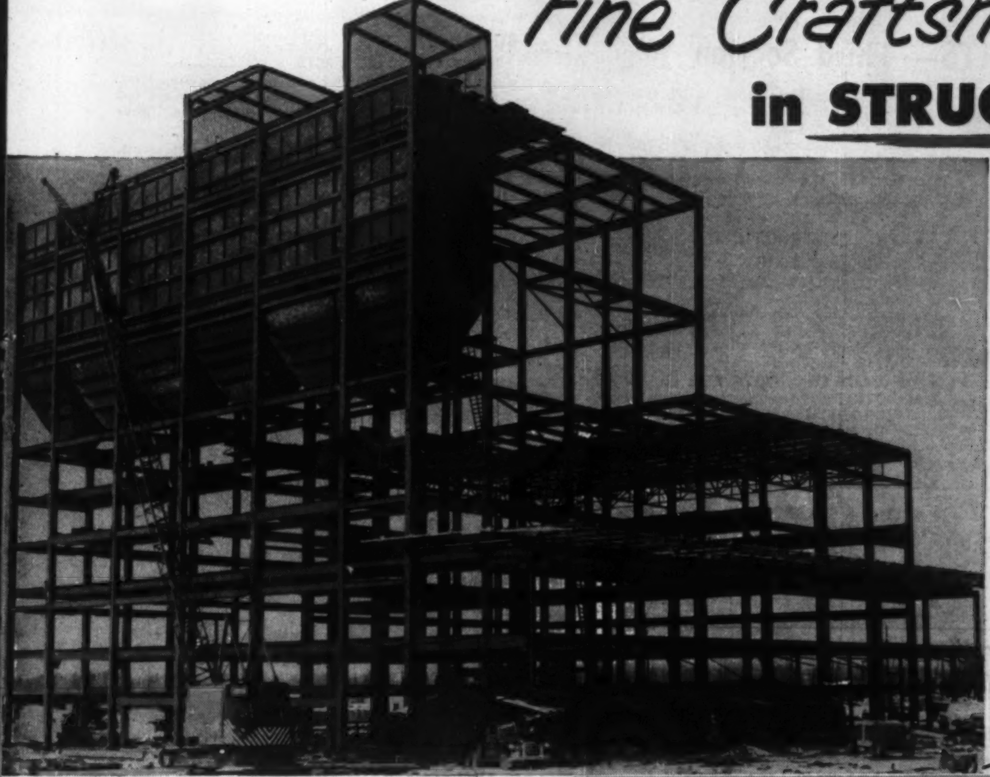
You can't do better than to specify "Wisconsin Power" for your equipment. For detailed data, ask for Bulletin S-164.

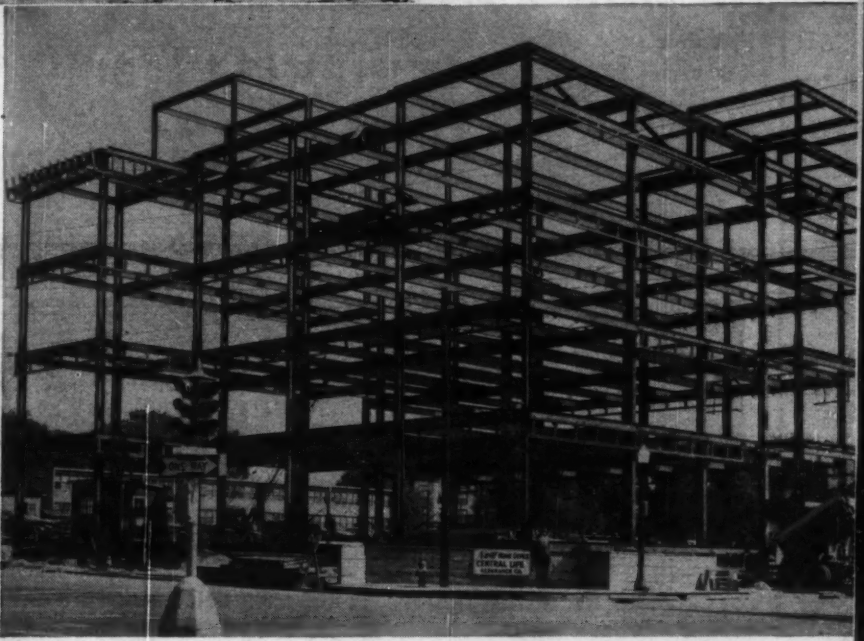
MOST H.P. HOURS
WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

Fine Craftsmanship
in STRUCTURAL STEEL

for a wide range of industrial and commercial requirements—

Coast to Coast...


Municipal Power Plant
Richmond, Ind.


Central Life Assurance Co.
Des Moines, Ia.

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CHICAGO (3), 1218 First National Bank Bldg.
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DES MOINES (8), 915 Tuttle Street
DALLAS (1), 1219 Praetorian Bldg.
SEATTLE . . . . 522 Lane Street
SANTA CLARA, CAL., 621 Alviso Road

CONSTRUCTION REPORTS—Third Section

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

STREETS AND ROADS

February 23 Massachusetts

BIDS ASKED—BUILDINGS

Mass., Lynnfield—SCHOOL—BA 2/24—Town, School Bldg. Comn., Howard Amerding, chn., elementary school, Summer St. $390,000. Extended date. Rich & Tucker Assoc., 45 Newbury St., Boston, archts. CD 2/1.

Conn., New Haven—SCHOOL—BA 2/25—City, G. R. Tobinson, purch. agt., 200 Orange St., L. Wheeler Beecher School addn., Blake and Jewell Sts., Westville Area. $390,000. Plans deposit $50. Schilling & Boldbecker, 18 Trumbull St., archts. Gordon MacMaster, 151 Court St., assoc. archt. CD 7/21.

Mass., Hudson—SCHOOL—BA 2/28—Town, C. Myron Billings, supt. Schools, High St., high school, Packard St. $700,000. Plans deposit $100, refundable. Perley F. Gilbert Assoc., Inc., 53 Central St., Lowell, archt. CD 2/7, under LB.

▲ **Conn., Hamden**—SCHOOL—BA 3/2—Town Bd. Educ., 2040 Dixwell Ave., Junior High School, Newhall St. $1,600,000. Plans deposit $75. Extended date. Warren H. Ashley, 967 Farmington Ave., West Hartford, archt. CD 1/17.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **MASSACHUSETTS**—Massachusetts Turnpike Auth., 80 Boylston St., Boston,

Grandview Constr. Corp., 740 S. Fulton Ave., Mount Vernon, N. Y. LB **$3,764,692**, est. $3,500,000. Contr. 51-052 hy. and bridge, Palmer. Bids Feb. 8. CD 1/12.

† **The Arundel Corp.**, Pier 2, Platt St., Baltimore, Md., LB, **$249,340**, maintenance dredging Thames River, CIVENG-19-016-55-25, CONNECTICUT. U. S. Eng., 587 Commonwealth Ave., Boston, Mass. Bids Feb. 8. CD 1/20.

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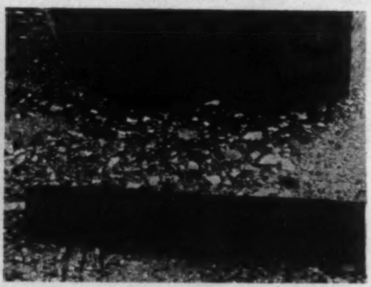
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BUILDINGS

LOW BIDS AND CONTRACTS

Bilt-Rite Constr. Co., 138 Conant St., Beverly, Mass. Separate Contracts. Approx. **$400,000.** 30 Cape Cod and ranch style RESIDENCES, Brimbal Ave., BEVERLY, MASS.

Samuel Z. Rosen, 57 Harvard Ave., Brookline, Mass. Owner Builds. Approx. **$900,000.** APARTMENT, 70 units, two 6 story, bsmnt. buildings, Park St., BROOKLINE, MASS. Samuel Glaser Assoc., 105 Newbury St., Boston, Mass., archts.

▲ **Jefferson Constr. Co.**, 75 First St., Cambridge, Mass. LB **$1,163,000.** elementary SCHOOL Ringe Ave., CAMBRIDGE, MASS. City, School Dpt., 1700 Cambridge St., Cambridge, Mass. Bids Feb. 7. CD 1/11.

Bilt-Rite Constr. Co., Inc., 138 Conant St., Beverly, Mass. Separate Contracts. Approx. **$500,000.** 40 Cape Cod and ranch style RESIDENCES, Balch Ave., WENHAM, MASS.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

February 23 Maryland

February 24 New Jersey & Pennsylvania

STREETS AND ROADS

February 21 New Jersey

BIDS ASKED—BUILDINGS

▲ **D. C., Wash.**—BA 2/23—D. C. Govt. Dir. Bldgs. & Grounds, 499 Pa. Ave. N. W., elementary school, replacement for Van Ness Elementary, 5 St. between L and M Sts. S. E. $1,410,000. Plans deposit $25. CD 5/13/52.

▲ **N. Y., Albany**—HOSPITAL—BA 3/8—Albany Hospital, New Scotland Ave., 6 story hospital. $2,000,000-$2,500,000. Extended date. William A. Riley, 45 Newbury St., Boston, Mass., archt. CD 1/27.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **General Railway Signal Co.**, 230 Park Ave., New York 17, N. Y., LB **$7,192,238**, furnishing, installing block signaling and interlocking equipment for Liberty Avenue Line, Euclid Ave. and Pitkin Ave. Yard to Lefferts Ave. and the Rockaway Line, Liberty Ave. to south of North Channel Drawbridge, Brooklyn and Queens Boros, NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Feb. 4. CD 1/5.

▲ **T. & T. Cont. Corp.**, 4814 Glenwood Rd., Brooklyn 3, N. Y., LB **$1,466,941**, est. $1,644,200, storm trunk sewer and appurtenances. Springfield Blvd. from 112 Rd. southerly location to point approx. 60 ft. south of Jamaica Ave.; sanitary sewer and appurtenances, Springfield Blvd., W. S. from 112 Rd. southerly to Hempstad Ave. and from 99 Ave. to 97 Ave. southerly location, sanitary sewer and appurtenances, Springfield Blvd., E. S., from 99 Ave. to 97 Ave. northerly location, Queens Boro. NEW YORK. President Queens Boro, Queens Boro Hall, 120-55 Queens Blvd., Kew Gardens 24, N. Y. Bids Feb. 7. CD 1/24.

▲† **T. C. Bateson Constr. Co.**, 6800 Denton Dr., Dallas, Tex., CA **$5,208,299**, bldgs. and utilities, FY 55, Plattsburgh Air Force Base, PLATTSBURGH, N. Y. U. S. Eng., 80 Lafayette St., New York 13, N. Y. Bids Jan. 25. CD 1/27, under LB.

▲ **NEW JERSEY**—New Jersey Turnpike Auth., Admin. Bldg., New Brunswick,

American Bridge Co., 71 Broadway, New York, N. Y., LB, **$2,139,800**, Contract N 27B, fabrication and erection superstructure steelwork for Section B of North Terminal Ramps on Newark Bay-Hudson Co. Extension of N. J. Turnpike, Jersey City, Hudson Co. Bids Feb. 8. CD 1/17.

NEW JERSEY—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Cayuga Foundation Corp., 30 Vesey St., New York, N. Y., CA **$665,895** Contract 26B, 23 piers for North Terminal Ramps (Section B) on Newark Bay-Hudson County Extension of N. J. Turnpike, Jersey City, Hudson Co. Bids Feb. 1 CD 2/4, under LB.

▲ **PENNSYLVANIA**—Pennsylvania Turnpike Comn., 11 N. 4 St., Harrisburg,

Badgett Mine Stripping Corp., White Haven, Pa., LB **$5,488,530**, constr. 3.58 mi. Sect. 37-F of Northeastern Exten. in Bear Creek Twp. and 3.72 mi. Sec. 37-G of Northeastern Exten. in Bear Creek, Plains and Jenkins Twps., Luzerne Co. Bids Feb. 8. CD 1/14.

BUILDINGS

LOW BIDS AND CONTRACTS

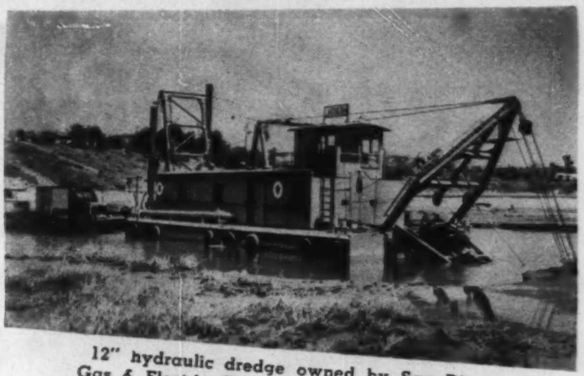
▲ **American Machine & Foundry Co.**, 261 Madison Ave., New York, N. Y., CA Est. **$1,000,000-$1,500,000.** NUCLEAR RESEARCH REACTOR and LABORATORY, near New York City, NEW YORK. Industrial Reactor Research Facility, c/o contractor.

▲ **Vermilya-Brown Co. Inc.**, 100 E. 42 St., New York 17, N. Y. CA **$1,500,000.** HOSPITAL WING, MT. VERNON, N. Y. Mt. Vernon Hospital, N. 7th Ave., Mt. Vernon, N. Y. CD 11/30.

▲ **Starrett Brothers & Eken, Inc.**, 63 Wall St., New York 5, N. Y., CA **$10,000,000.** 20 story BANK and OFFICE, 5th Ave., 44 and 45 Sts., NEW YORK, N. Y. Bank of New York, 530 5th Ave., New York, N. Y. CD 8/11.

(Continued on page 230)

10" hydraulic dredge operating in Florida for the Indian River Mosquito Control District—installed Sept. 1954



12" hydraulic dredge owned by San Diego Gas & Electric Co.—installed February 1954

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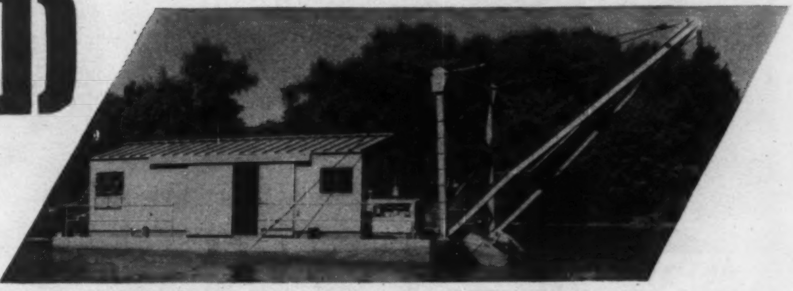
8" hydraulic dredge removing silt for the Salt River Valley Water Users' Association—installed June 1954



8" hydraulic dredge excavating gravel in Illinois for Rock River Ready Mix Co.—installed April 1954

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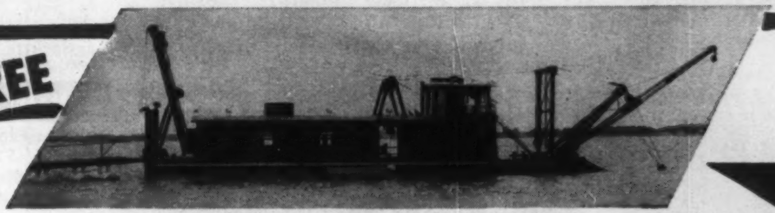

12" hydraulic dredge reclaiming land for the State of Ohio on Lake St. Marys—installed June 1954

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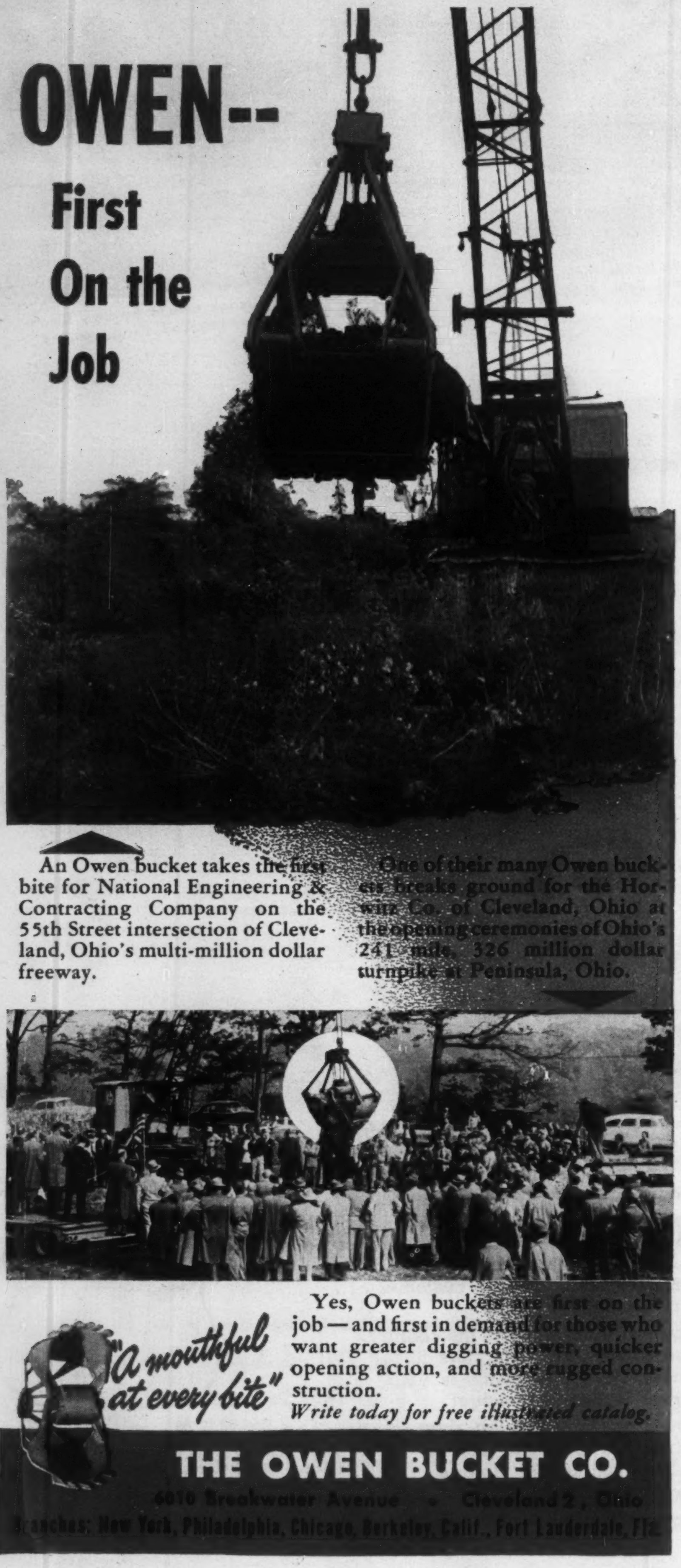

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(Continued from page 228)

▲ **Psaty & Fuhrman, Inc.**, 369 Lexington Ave., New York 17, N. Y., LB **$4,210,000,** general constr.;

Eugene J. Brandt & Co., Inc., 847 11th Ave., New York 19, N. Y. and **J. W. Hubert Corp.**, 39-22 30th St., Long Island City 1, N. Y., LB **$528,050,** heating;

John G. Hellman, 391 Fulton St., Brooklyn 1, N. Y. LB **$871,319,** electrical work;

Otis Elevator Co., 260 11th Ave., New York, N. Y., LB **$407,812,** escalators for new New York SCHOOL of PRINTING, W. 49 St. and W. 50 St., between 9th and 10th Aves., Manhattan Boro, NEW YORK, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. Bids Feb. 4. CD 1/26.

▲ **U. S. Gypsum Co.**, 300 W. Adams St., Chicago, Ill. Separate Contracts. gypsum board PLANT, 50-acre tract, STONY POINT, N. Y.

Montgomery Homes, Inc., 29 Old Lancaster Rd., Bala Cynwyd, Pa., Separate Contracts. **$650,000.** RESIDENTIAL DEVELOPMENT, Walnut St., LINDENWOLD, N. J.

▲ **Cadillac Builders, Inc.**, Route 130, Burlington, N. J. Separate Contracts, **$2,000,000,** RESIDENTIAL DEVELOPMENT, Nottingham Way, TRENTON, N. J. Wm. Dean Faint, 1915 Browning Rd., Pennsauken, N. J., archt.

Joseph E. Heffernan, Guilford St. and Rowland Ave., Phila., Pa., CA **$775,000.** Catholic HIGH SCHOOL, CONSHOCHOKEN, PA. R. C. Archdiocese of Phila., 310 N. 19 St., Phila., Pa. CD 11/8.

B. Bornstein & Son, 2027 Arch St., Phila., Pa., CA **$647,600,** general constr. Elementary SCHOOL, West Glenside, GLENSIDE, PA. Cheltenham Twp. School Dist. Auth., Elkins Park, Pa. Bids Jan. 27. CD 2/2, under LB.

Lafayette Constr. Co., 315 DeKalb St., Norristown, Pa. Separate Contracts. **$540,000.** RESIDENTIAL DEVELOPMENT, Joshua Rd., LAFAYETTE HILLS, PA. Henry S. Berg, 1411 Walnut St., Phila., Pa., archt.

▲ **Joseph Barness & Son**, Warrington, Pa., Separate Contracts. **$2,500,000.** RESIDENTIAL DEVELOPMENT, Upper Dublin Twp., Willow Manor, MONTGOMERY, PA.

Franklin P. Storch, 611 Rodman St., Jenkintown, Pa. Separate Contracts. **$454,000.** RESIDENTIAL DEVELOPMENT, DeKalb Pike, NORRISTOWN, PA. John V. Hoey, 824 W. Marshall St., Norristown, Pa., archt.

▲ **Sam Himelfarb & Sons**, 1130 Friendship St., Phila., Pa. Separate Contracts. **$1,200,000.** RESIDENTIAL DEVELOPMENT, Red Lion Rd., PHILA., PA. Leon Levin, 311 S. 20 St., Phila., Pa., archt.

Strafford Development Co., 405 Arch St., Phila., Pa. Separate Contracts. **$560,000.** RESIDENTIAL DEVELOPMENT, Ashbourne Rd., PHILA., PA. Sherwin Rochlis, 5664 Diamond St., Phila., Pa., archt.

▲ **Morris Schuman**, 1047 N. 68 St., Phila., Pa. Separate Contracts. **$2,228,000.** RESIDENTIAL DEVELOPMENT, Willits Ave., PHILA., PA. Ralph Caldwell, Richboro, Pa., archt.

Joseph Barness & Son, Warrington, Pa. Separate Contracts. **$500,000.** RESIDENTIAL DEVELOPMENT, Diamond St., SELLERSVILLE, PA.

Joseph E. Heffernan, Guilford St. and Rowland Ave., Phila. Pa., CA **$650,000.** 8 store SUPERMARKET, driveways, parking area and req. utilities, WILMINGTON DEL. Brandywine Shopping Center, Inc., c/o contractor. George W. Neff, 1520 Locust St., Phila., Pa., archt.

▲ **Northern Builders, Inc.**, 110A South Union St., Wilmington, Del. Separate Contracts. **$1,000,000.** RESIDENTIAL DEVELOPMENT, Hyde Park Development, WILMINGTON, DEL.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

February 22 North Carolina, South Carolina
March 4 Tennessee

STREETS AND ROADS

February 22 North Carolina, South Carolina

BIDS ASKED—BUILDINGS

S. C., Johnston—SCHOOLS—BA 3/3—School Bd., Johnston, two school bldgs., totaling 49,000 sq. ft. $445,700. Plans deposit $50. Lyles, Bissett, Carlisle & Wolff, 1320 Bull St., Columbia, engrs.-archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Somerville Constr. Co.**, 6648 Fulton Rd. E., Ada, Mich., CA **$1,039,511,** natural gas distr. sys.;

McDonough Constr. Co. of Ga., 7 Baltimore Pl. N.W., Atlanta, Ga., CA **$452,240,** conversion 35,000 dwellings unit from other fuels to natural gas, OAK RIDGE, TENN. Oak Ridge Utility Dist., Oak Ridge, Tenn. J. W. Goodwin Eng. Co., 2111 7th Ave. S., Birmingham, Ala., engr. Awarded Feb. 8.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

March 1 Wisconsin

STREETS AND ROADS

March 1 Wisconsin

▲ **Ind., Indianapolis**—BA 2/28—Bd. Sanitary Comrs., City Hall, sanitation plant addn. **$1,500,000.** CD 8/7/53.

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▲ **Ind., Indianapolis**—BA 3/14—Bd. Sanitary Comrs. City Hall, incinerator addn. $4,250,000. CD 8/7/53.

BIDS ASKED—BUILDINGS

Ind., Franklin—BA 3/15—SCHOOL—City of Franklin, 10-room school, $400,000. CD 5/11.

Ill., Chicago—HOTEL—BA About 3/1—Owner, c/o Greenberg & Finfer, 58 E. S. Water St., hotel, near South Cicero Ave. and 22 St. $400,000.

O., Dayton—BOYS CLUB—BA 3/2—Boys Club, Floyd Gates, dir., 15 Gates St., 1½ story, 31,200 sq. ft. Boys Club Bldg., Bradford St. and Beddies Lane, with 30x75 ft. pool. $500,000. Ohler & Reed, Hulman Bldg., archts. CD 8/19.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **H. W. Miller Constr. Co.**, 1511 Neave St., Covington, Ky., LB **$1,662,128,** power and service bldg, for Mill Creek Sewage Works, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Feb. 1. CD 1/21.

▲† **W. L. Johnson Constr. Co. & Assoc.,** P.O. Box 218, Bexley Station, Columbus 9, O., CA **$3,125,886,** airfield paving, Lockbourne Air Force Base, ENG-46-022-55-9, COLUMBUS, O. U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va. Bids Jan. 20. CD 1/25 under LB.

Rocco Ferrera, Livonia, Mich., LB **$418,205,** 4 mi. Sect. 2 of Truro trunk sewer to service newly-annexed area, COLUMBUS, O. City, City Hall, Columbus, O. CD 11/28/50.

Oberer Constr. Co., 441 E. Siebenthaler St., Dayton, O., CA **$535,032,** sewer lines in Northridge Dist. DAYTON, O. Comrs. Montgomery Co., Court House, Dayton, O. Bids Dec. 17, awarded Jan. 20. CD 12/30 under LB.

Southern Hills Pit, Inc., 2415 S. Dixie St., Dayton, O. CA **$787,904,** sewer lines for Phase 1, Northridge Dist., DAYTON, O. Comrs. Montgomery Co., Court House, Dayton, O. Bids Dec. 13, awarded Jan. 20. CD 12/30, under LB.

L. Walker Fauber, 319 Claremont Ave., Ashland, O. LB **$670,694.** water supply sys. for Stow Twp. STOW, O. Comrs. Summit Co., Court House, Akron, O. Bids Jan. 21. CD 1/17.

▲ **ILLINOIS**—State Div. Hys., Springfield,

S. J. Groves & Sons Co., 1104 W. Reynolds St., Springfield, Ill., CA, **$632,383,** c. conc. paving 3.56 mi. U. S. 24, Peoria Co.;

Joyce Bros. Constr. Co., 715 Meyers Bldg., Springfield, Ill., CA, **$528,325,** c. conc. base course wid'n. 3.81 mi. c. conc. base course 1.9 mi. and granular embankment 0.4 mi. on U. S. 67, Cass Co. Bids Jan. 28, awarded Feb. 8. CD 2/1, under LB.

Luedtke Eng. Co., Frankfort, Ky. CA **$283,440.** Contr. No. 1, lake intake line;

Charles F. Smith & Son, Inc., Walnut and Birch Sts., Kennett Square, Pa. CA **$668,228.** Contr. No. 2, transmission line, river crossing aerial steel pipe over Black River, HOLLAND, MICH. City, City Hall, Holland, Mich. Bids Jan. 24. CD 1/4.

▲ **MICHIGAN**—State Hy. Dpt., Stevens T. Mason Bldg., Lansing,

Loselle Constr. Co., 1555 Goddard St., Wyandotte, Mich. CA **$1,126,612.** est. $1,180,000. 24 ft. dual c. conc. Detroit-Toledo Expressway, IN 58-57 C14-U (IN 424 11), Monroe Co.;

Carl Goodwin & Son, Allegan, Mich. CA **$623,994,** est. $660,000. 9 in. uniform c. conc. U. S. 127, F 26-3 C8-R, F 30-31-C2-R, F 38-7 C5-R (F 167 6), Lenawee, Hillside and Jackson Counties. CD 1/25, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Shepherd Constr. Co.,** 220 N. Broadway, Joliet, Ill., CA **$3,000,000.** SHOPPING CENTER, along Route 30 at Larkin Rd., JOLIET, ILL. Hillside Center Inc., c/o Scott S. Bigelow, archt., 815 Westshire Dr., Joliet, Ill. Awarded Feb. 2.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

February 25 Missouri, North Dakota

STREETS AND ROADS

February 22 Iowa February 25, Missouri, North Dakota

▲ **Colo., Colorado Springs**—BA 3/2—City, City Hall, 41,000 ft. 24-in. pipe for water line to connect the city's storage on Pikes Peak with Air Academy site, $1,300,000. Douglas Jardine, Colorado Springs, engrs. CD 8/18.

Tex., Baytown—BULK TERMINAL STATION—Bids Asked—Humble Oil & Refining Co., Baytown, new bulk terminal station for bulk station, truck terminal, warehousing, garage shop, loading and unloading docks. $450,000. CD 4/5.

BIDS ASKED—BUILDINGS

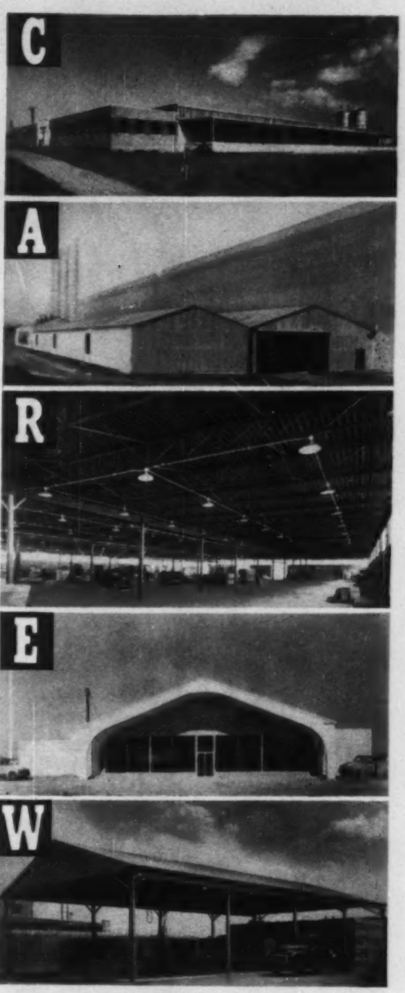
▲ **Tex., Baytown**—REFORMING UNIT—Bids Asked—Humble Oil & Refining Co., Humble Bldg., Houston, reforming unit at existing refinery, $3,750,000. CD 1/14.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **IOWA**—State Hy. Comn., Ames,

Booth & Olson, Inc., 529 Insurance Exchange Bldg., Sioux City, Ia., LB, **$171,532;** paving 2.109 mi. F-564 (2),



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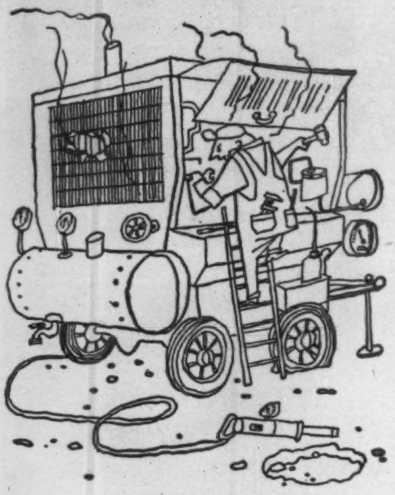

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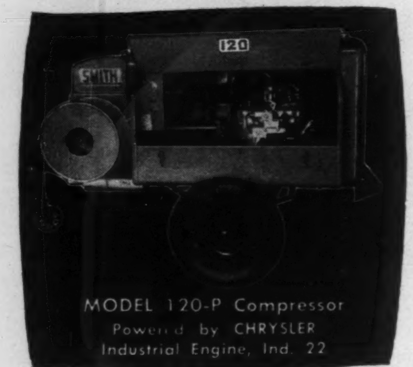

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Fred Carlson Co., Decorah, Ia., LB, **$135,494** paving 0.866 mi. F-284 (4) Howard Co.; LB **$79,012** paving 0.489 mi. F-928 (3), Howard Co.;

E. M. Duesenberg, Inc., Clear Lake, Ia., LB, **$366,443** paving 6.035 mi. F-1029 (2), Carroll and Greene Counties;

Stade Constr. Co., Fairmont, Minn., LB, **$193,054** pavement wid'n. 11.85 mi. FN-13, Webster Co.; LB **$282,292,** stab. base and bit. 9.69 mi. F-745 (6), Louisa Co.;

Kaser Constr. Co., 3111 Ingersoll St., Des Moines, Ia., LB, **$92,431,** stab. base, bit. surf. 16.124 mi. FN-3, Davis, Van Buren and Wapello Counties;

Concrete Materials & Constr. Co., 405 Granby Bldg., Cedar Rapids, Ia., LB, **$223,417,** stab. base, bit. 6.273 mi. F-932 (9), Henry Co.;

J. W. Craig Co., 1814 N.E. California St., Minneapolis, Minn., LB, **$203,351,** stab. base, bit. 7.043 mi. F-744 (4), Ida and Woodbury Counties. Bids Feb. 8. CD 1/26.

▲† **Western Contg. Corp.,** 400 Benson Blvd., Sioux City, Ia., LB **$5,098,188,** earthwork, Stage IV, Oahe Reservoir Proj., Pierre, Inv. 25-066-55-73, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Feb. 8.

COLORADO—State Hy. Dpt., 518 State Office Bldg., Denver,

Schmitt Constr. Co., Grand Junction, Colo., CA, **$437,891,** est. $440,146, b. conc. 4.073 mi. State Hy. No. 4, near Grand Junction, Colo. Proj. F 001-1 (8), Mesa Co. Bids Jan. 28, awarded Jan. 31. CD 1/19.

COLORADO—State Hy. Dpt., 519 State Office Bldg., Denver,

Western Paving Constr. Co., 5105 North Washington St., Denver, Colo., CA **$744,690,** est. $741,637 asph. surf. 6.987 mi. State Hy. No. 3, Colo. Proj. F 006-1 (12), Brighton, Weld Co. Bids Feb. 1, awarded Feb. 4. CD 2/8, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

R. W. Rinderknecht Co., 113 F Ave. N.W., Cedar Rapids, Ia., CA, **$500,000,** SERVICE, STORAGE with OFFICE, CEDAR RAPIDS, IA. Martin-Roasa Tractor & Equipment Co., 3117 First Ave. S.E., Cedar Rapids, Ia. E. H. Healey, 213 Higley Bldg., Cedar Rapids, Ia., archt. CD 2/25/54.

Patti Constr. Co., 2029 Kansas St., Kansas City, Kan. CA Est. **$750,000.** CLASSROOMS and ADMINISTRATION BLDG., KANSAS CITY, MO. Rockhurst College, 52 and Troost Sts., Kansas City, Mo. Awarded Feb. 8.

Northwestern Public Service Co., Huron, S. D. Owner Builds. Approx. **$125,000.** GAS PLANT, distr. sys., ABERDEEN, S. D.

Gulf Constr. Co., 821 Chelsea Blvd., Houston, Tex., LB **$550,000.** RECEIVING, TREATMENT BLDG., for Austin State School, AUSTIN, TEX. Bd. for Texas State Hospitals & Special Schools, 4405 Lamar Blvd., Austin, Tex. Bids Feb. 3. CD 12/27.

C. Grady Cates, Jr., Builder, 9747 Harry Hines Blvd., Dallas, Tex., CA **$683,150,** Group 3, 18 DWELLINGS; Group 5, 41 DWELLINGS, FARMERS BRANCH, TEX. C. Grady Cates, Jr., 9747 Harry Hines Blvd., Dallas, Tex. CD 12/13.

Arrington-Bradley Bldg. Co., Inc., 7445 Park Pl. Blvd., Houston, Tex., CA **$709,338,** Group 1, 24 DWELLINGS; Group 6, 19 DWELLINGS, HOUSTON, TEX. Lakeside Oaks Development Corp., 7445 Park Pl. Blvd., Houston, Tex. CD 12/27.

Bob Kuldell, 4703 Fannin St., Houston, Tex. Own Forces. **$619,C00,** Group 4, 18 DWELLINGS; Group 7, 15 DWELLINGS, HOUSTON, TEX. CD 11/30.

Bellaire Lumber Co., 7903 S. Flores St., San Antonio, Tex. Own Forces. **$628,000,** 63 DWELLINGS, in Morningside Park Area, SAN ANTONIO, TEX. CD 12/9.

Miller-Davis Co., 1029 Portage Ave., Kalamazoo, Mich. CA Est. **$600,000.** general contract 1 story, 64,000 sq. ft. milk container mfg. PLANT, McGregory Hy., WACO, TEX. International Paper Co. (Pure Pak), 220 E. 42 St., New York, N. Y.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

March 1 Washington | **March 2 California**

STREETS AND ROADS

March 1 Washington | **March 2, 3 California**

BIDS ASKED—BUILDINGS

Wash., Yakima—SCHOOL—BA 3/1—West Valley School Dist. 208, Yakima, 7 rein.-con. high school bldgs. $800,000. Plans deposit $50. J. W. Maloney & J. H. Whitney, Larson Bldg., archts. CD 4/21.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Cherf Bros., Inc. & Sandkay Contractors, Inc.,** Ephrata, Wash., LB **$1,297,368,** est. $1,282,522, earthwork, pipe lines, concrete lining, structures for Potholes East Canal laterals, sublaterals and waste-ways, Block 19, Columbia Basin Proj., Spec. DC 4310, WASHINGTON. Bureau Reclamation, Dpt. Interior, Ephrata, Wash. Bids Feb. 3. CD 1/12.

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BUILDINGS

LOW BIDS AND CONTRACTS

William Peper Constr. Co., 103 W. Windsor St., Phoenix, Ariz., CA **$359,000.** GRAMMAR SCHOOL, SCOTTSDALE, ARIZ. Scottsdale School Dist., Scottsdale, Ariz. CD 1/28, under LB.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

▲ **C. A. Pitts General Contractor Ltd.,** 67 Yonge St., Toronto, Ont. CA **$2,486,000.** about 2,000,000 tons crushed rock and sand, St. Lawrence Power Proj., vicinity of Cornwall, ONTARIO. Hydro Electric Power Comn. of Ontario, 620 University Ave., Toronto 20, Ont. Bids Jan. 5. OD 12/2.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Alexander Fleck Ltd., 416 Wellington St., Ottawa, Ont., CA, **$643,570,** pipe supply for water mains, OTTAWA, ONT. City, N. R. Ogiloy, city clk., Ottawa, Ont

BUILDINGS

LOW BIDS AND CONTRACTS

North American Lumber & Supply Co. Ltd., Fort and St. Marys Ave., Winnipeg, Man., CA, **$569,800,** Junior-Senior HIGH SCHOOL, Arnold Ave., WINNIPEG, MAN. School District No. 1, William and Ellen Sts., Winnipeg, Man. Bids Feb. 3, awarded Feb. 4. CD 1/26

K. M. S. Construction Ltd., 1501 St. Catherine St. W., Montreal, Que., Owner Builds, **$580,000.** 34 duplexes in HOUSING DEVELOPMENT, Ville St. Michel, MONTREAL, QUE. Ben-Ami Shulman, 5174 Cote des Neiges Rd., Montreal, Que., archt.

Cite Constr. Ltd., 275 St. Zotique St. E., Montreal, Que., CA, **$600,000.** SCHOOL and RESIDENCE, St. Jean Baptiste Blvd., POINT AUX TREMBLES, QUE. SCHOOL Com. of Pointe Aux Trembles, Point Aux Trembles, Que. Bids Nov. 29, awarded Feb. 4. CD 11/17.

▲ **A. W. Lanctot & Co. Ltd.,** 5336 Queen Mary Rd., Montreal, Que., Owner Builds, **$1,500,000,** 150-unit HOUSING in Parish of St. Constant, ST. CONSTANT, Que.

Dpt. P. Wks., Parliament Bldgs., Regina, Sask., cancelled bids to have been opened Feb. 28, superstructure on NURSING HOME, REGINA, SASK. Over **$600,000.** Will re-advertise. CD 1/26.

ALASKA

BIDS ASKED—BUILDINGS

† **Alaska**—SCHOOL—BA 3/16—Alaska P. Wks., Dpt. Interior, 123 W. 3 St., Juneau, rein.-con. addn. to Woodland Park Elementary School. Proj. 50-A-139. $388,000. Plans deposit $25. Manley & Manger, Loussac-Sogn Bldg., archts. CD 9/17.

AMERICANS ABROAD

BIDS ASKED—HEAVY CONSTRUCTION

Bids will be taken on the following projects under recently announced International competitive bidding of NATO.

FRANCE

M. Aigrot, French Delegate to NATO, Palais de Chaillot, Paris,

constr. Cambrie-Glons pipe line, 35 mi. long, 12 in. diam. Bidding will close March 2.

constr. Metz-Deuxgaponts pipe line, 75 mi. long, 10 in. diam. Bidding will close March 10. For information on bidding NATO projects see 6/25/54 Construction Daily.

BUILDINGS

LOW BIDS AND CONTRACTS

Koppers Co., Inc., Koppers Bldg., Pittsburgh, Pa. CA design and construct BLAST FURNACE for steel mill AVILES, SPAIN. Empresa Nacional Siderugica S.S., Madrid, Spain.

FOREIGN

BIDS ASKED—HEAVY CONSTRUCTION

▲ **China, Hong Kong**—AIRPORT IMPRVS.—Bids Asked—Govt. Hong Kong, T. L. Bowring, dir. P. Wks., airport imprvs., incl. 3.75 mi. seawall, reclamation, incl. 12,000,000 cu. yd. fill, asphalt surfaced runway and taxiway on stone base at Kai Tak Airport, Contr. 9. $17,230,000. Scott & Wilson, Kirkpatrick & Partners, Hong Kong, engrs.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Societa Generale Montecatini,** Milan, Italy (Chemore Corp., 21 West St., New York, N. Y., representative) CA **$14,000,000.** Design and construct urea and ammonium nitrate production PLANT, BIHAR, INDIA. Govt. of India, Delhi, India. Societa Ansaldo, Genoa, Italy will assist with equipment.

▲ **F. L. Smidth & Co.,** Copenhagen, Denmark, Ca Est. **$5,000,000.** CEMENT PLANT, MUNGYONG, KOREA. United Nations Reconstruction Agency, UN Building, New York, N. Y. and Ministry of Commerce & Industry, Republic of Korea, Seoul. CD 3/25.

(Proposal Advertisements see pp. 243 to 245)

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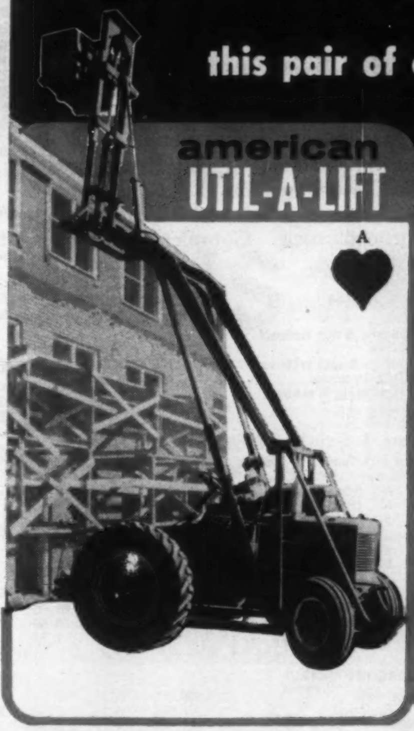

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UNIT PRICES

Bids for Freezing River Bed Swing Washington Dam Job

Merritt-Chapman and Scott Corp. and Savin Constr. Co., 28.2% below second bid on freezing a cofferdam cutoff wall, were 10.6% under on dam and road earthwork. These prices landed the $14.7 million contract for Seattle City Light Co.'s Gorge High dam and road.

Project engineer is C. E. Shevling. Dr. J. L. Savage is consultant.

This concrete power dam on Skagit River northeast of Seattle will have a 220-ft straight gravity section of 285-ft height and a 450-ft, 270-ft high arch. Road work includes 1.5 mi widening, 4.25 mi new road, and 0.25 mi tunnel through rock. Completion time is 1500 days.

	Bidder	Total
1C	Merritt-Chapman and Scott Corp., New York, N. Y., and Savin Constr. Corp., East Hartford, Conn.	$14,735,107*
2	C. J. Montag & Sons, Carl M. Halverson, Inc., Cascade Contractors, Inc., Austin Construction Co., J.C. Boespflug Construction Co., Portland, Ore.	14,782,115*
8	Guy F. Atkinson Co., San Francisco, Calif	22,936,386*

Site preparation:

Bids. 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Clearing damsite	ls	1	$25,000	$37,500
Diversion & care river	ls	1	900,000	497,000
Moving garages	ls	1	2,000	3,900
Widen road	ls	1	100,000	85,000
Temp creek bridge	ls	1	50,000	37,500
remove	ls	1	5,000	4,700
Flume for creek divern	ls	1	20,000	40,000
Pumpg boil into reserv, shifts	ea	400	100.00	20.00

Cofferdam & freezing:

Bids. 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Timber crib cofferdam	Mfbm	210	300.00	310.00
Rock fill	cy	5,100	3.00	1.90
Conc for rock consolid.	cy	6,000	12.00	6.25
Pump walls 12"	lf	1,050	45.00	55.00
test	ea	3	3,500	1,000
pumpg, shifts	ea	8,000	20.00	12.50
Holes for freeze 0-35′	lf	5,020	20.00	38.75
35-60′	lf	3,240	20.00	38.75
60-110′	lf	4,000	18.00	38.75
110-160′	lf	1,710	18.00	38.75
below 160′	lf	1,180	18.00	38.75
Casing holes, timb cribs	lf	840	20.00	7.75
Perf casing	hr	1,500	20.00	23.25
For freezing points:				
drill EX coreholes	lf	450	15.00	19.00
pres grtg 6" holes	cf	40,000	2.00	2.35
Rem solid grt frm holes	lf	14,500	0.75	2.30
Cmt, handle quick set	lb	15,000	0.04	0.20
Refrigeration plant, f&i	ls	1	100,000	215,000
operate, shifts	ea	2,700	100.00	132.00
Pipe & fitgs, f&i:				
3"	lf	16,000	1.25	1.85
1" met for frz pts or	lf	16,000	0.75	1.25
plastic alternate	lf	16,000	0.50	1.85
Metal assemblies, f&i	ea	150	15.00	20.00

Earthwork, dam:

Bids. 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Plant & eq except hwy, f&i, mov in & out	ls	......	1,000,000	1,800,000
Exc, dam abv el 785 & intake abv 882.5	cy	166,000	3.50	2.30
dam, el 785 to 725	cy	313,500	1.50	2.35
below 725	cy	272,500	1.65	3.50
intake struct below 882.5	cy	12,500	3.50	5.00
intake tunnel	cy	1,500	40.00	62.50
Fndn cleanup, prelim	sq	110	20.00	20.50
final	sq	730	80.00	27.50
Exc, throttling orifice	cy	30	100.00	175.00
RC, intake tunnel	cy	300	90.00	62.50
Fill exist const tunnel & old intake tunnel	ls	......	12,000	15,000
Road, to top dam, exc	cy	32,000	1.80	1.80
embank	cy	33,000	0.50	0.25

Grouting:

Bids. 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Holes 0-35′	lf	13,000	3.70	4.00
35-60′	lf	5,700	3.70	4.00
60-110′	lf	8,700	4.00	4.50
110-160′	lf	4,400	4.00	4.70
160-210′	lf	300	4.20	4.70
intk area, prior exc	f	6,400	4.00	5.00
Intake, prior exc.	cf	5,000	4.00	3.40
Pipe & fitgs, fndn grtg & drainage, met	lb	11,000	0.60	0.90
Pipe, grt & vnt, th orif	lb	160	2.00	5.00
Between throt orif conc & rock	cf	10	7.00	3.50
Outlets, spec	ea	2,600	4.00	4.40
Hookups for holes:				
packer grtd	ea	600	10.00	19.00
without packers	ea	500	10.00	12.50
Fndns:				
with packr or expan plg	cf	17,000	3.00	3.10
without	cf	9,600	3.00	3.00
below minimum, shifts	ea	75	300.00	125.00
Met tubg & fitg, contract joints	lb	24,000	0.60	0.90
Contr jts & cool systems	cf	3,100	2.00	5.00
Backfill in tunnel	cf	700	6.00	3.75
Catwlk, coolg & contract joint	lf	1,500	5.00	10.00

Core & drain holes:

Bids: 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Test intk tunnl core hls.	lf	40	15.00	10.00
Drill core holes:				
NX 0 to 50′	f	500	10.00	9.00
NX, 50 to 100′	lf	200	10.00	10.00
5½", to 30′	lf	200	16.00	20.00
Drainage holes 0 to 25′	lf	3,000	5.00	6.50
25 to 50′	lf	2,800	5.00	6.50
50 to 75′	lf	2,200	5.00	6.60
75 to 100′	lf	1,500	5.00	6.70
100 to 125′	lf	600	5.00	7.00
125 to 175′	lf	100	6.00	10.00
Pipe & fitgs, dam drains	lb	19,000	0.60	0.50
Drill hls grt anch bars	lf	1,100	2.00	1.50

Concrete work:

Bids: 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Reinf bars	lb	1,800,000	0.16	0.12
throt orifice	lb	7,000	0.20	0.25
Cement	bbl	310,000	4.75	5.55
5-ply sck, contract jt	bbl	400	6.00	6.55
other purp.	bbl	6,125	6.00	8.15
Plant & equip, conc mfg & pl, except hwy, f&i	ls	1	854,000	785,000
Conc in dam, gravity sec.	cy	135,000	11.00	10.25
arch sec	cy	132,000	12.00	11.10
spillwy crest overhg	cy	7,850	12.00	11.25
piers	cy	2,650	40.00	22.25
traing walls	cy	1,100	50.00	30.00
gate hst str	cy	815	60.00	53.00
countrwt	cy	165	40.00	31.00
bridge	cy	70	60.00	87.50
gravity retaing wall	cy	1,000	25.00	34.00
bkfl in shafts	cy	60	10.00	50.00
curbs & parapets	cy	280	60.00	62.00
blockouts	cy	160	150.00	100.00
intake structure	cy	3,500	55.00	44.00
hoist tower & substa	cy	270	100.00	100.00
tunnel lining	cy	800	55.00	56.00
plugs	cy	500	65.00	34.00
misc structs	cy	340	40.00	31.00
throttling orifice	cy	35	60.00	160.00
batch plant	cy	300	4.00	10.00
bkfl, divern conduit	cy	90	45.00	37.00
Gate & slot str, divern conduit	ls	......	2,000	2,500
Met tub & fit, cool syst	lf	385,000	0.30	0.40
Cool conc w river water	cy	267,000	0.40	0.25
Control jts, type A	lf	140	2.00	2.50
Met sealg strips	lf	7,900	3.00	3.00
grt groove cover plate	lf	2,200	0.75	0.60
Elastic jt filler	sf	850	0.30	2.50
Finish lightg recesses	ea	65	20.00	10.00

Steel and metal:

Bids: 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Install:				
frames & guides:				
gates	lb	280,000	0.20	0.09
riv outlet stoplogs	lb	35,000	0.30	0.09
gates	lb	1,030,000	0.15	0.09
hoists & controls:				
spillway gate	lb	100 000	0.15	0.05
riv outlt & intk	lb	82,000	0.20	0.10
& store stplg & lift b	lb	16,000	0.20	0.03
Str stl splway bri, f&e	lb	38,000	0.25	0.17
Hoist tower frame, erect.	lb	108,000	0.10	0.09
Track rl & access	lb	2,600	0.40	0.25
Install				
trashracks	lb	122,000	0.10	0.03
rake	ls	1	15,000	6,000
throttling orifice	lb	27,500	0.25	1.00
Met pipe & fitg, −6"φ	lb	2,600	0.60	0.50
+6"φ	lb	18,000	0.40	0.40
Bronze gt vlvs −6"φ	lb	100	4.00	2.50
Intk by-pass fillg line	lb	14,200	0.25	0.35
vlv, install	ls	1	1,000	600.00
Sump & water pumps inst	lb	14,700	0.40	0.20

Arch & struct finish:

Bids: 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Timb decking & covers	Mfbm	9	500.00	250.00
Roof ins, intake tower	sf	800	1.50	1.50
Roof unit substation	sf	380	1.00	1.25
Damp proof unit substa	sy	65	1.00	1.75
Sewer P, 4"	lf	260	0.75	1.25
Plumbg fixt, substation	ls	......	800.00	200.00
Grav sew disp field	cy	45	10.00	5.00
Backfill unit substation	cy	75	5.00	3.00
Misc met wk, dam, furn.	lb	10,000	0.40	0.30
install	lb	27,500	0.25	0.15
other than dam, furn	lb	40,400	0.40	0.25
install	lb	44,100	0.25	0.25
Met stairways, ladders, hndrl, except spiral	lb	24,000	0.60	0.70
Spiral stairways, install	lb	52,000	0.25	0.25
Anch bolt in conc, furn	lb	500	0.20	0.25
install embedded	lb	1,000	0.60	0.30
Swinging doors, install	sf	300	2.50	4.00
Steel windows in conc	sf	330	4.00	3.00
Louvers in conc	sf	80	4.00	3.00

Electrical:

Bids: 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Heaters, 3 to 5 kw	ea	2	200.00	150.00
Grounding system	lb	1,500	3.00	2.10
Embedded cond, install:				
½"	lf	100	1.20	1.20
¾"	lf	200	1.50	1.25
1"	lf	1,700	2.00	1.50
1½"	lf	400	2.00	2.50
2"	lf	125	3.00	3.00
2½"	lf	500	4.00	3.50
3"	lf	25	5.00	4.00
Embedded non-met cond,				
2"	lf	1,000	1.70	1.60
3"	lf	100	2.25	2.00
4"	lf	125	3.00	2.50
Exposed cond, install,				
½"	lf	100	2.00	1.10
¾"	lf	300	2.50	1.30
1"	lf	7,000	3.00	1.55
1½"	lf	100	3.50	2.80
2"	lf	900	5.00	3.10
2½"	lf	400	6.00	4.00
3"	lf	25	7.00	5.10
Wire,				
No. 12 AWG 600-volt	lf	8,000	0.20	0.15
10	lf	12,000	0.25	0.20
8	lf	100	0.30	0.25
6	lf	250	0.40	0.30
4	lf	1,400	0.50	0.40
Single conductor cable:				
No. 2 AWG 600-volt	lf	6,000	0.60	0.50
1/0	lf	1,000	1.00	0.70
3/0	lf	1,800	1.20	1.00
Install wave traps	ea	2	135.00	175.00
couplg capacitors	ea	2	110.00	240.00
50′ 7,500-v cable	ls	1	300.00	300.00
Light fixt, incand type A	ea	70	25.00	80.00
flood type V	ea	10	90.00	110.00
Install 9-kv lightn arr	ea	3	70.00	80.00
112.5-kva unit sub	ls	1	600.00	1,750
15-kw gas-eng gen	ls	1	750.00	1,500
120/208-volt panel	ls	1	300.00	100.00
circ brk for floodl	ls	1	70.00	70.00
Power receptacles:				
30 amp, 207-v	ea	12	50.00	65.00
100 amp	ea	1	135.00	120.00
Panelbrd, light & dist, i	ea	5	100.00	125.00
Circ brk for recorder, i	ea	1	50.00	70.00
7-conductor cable, 19/22 AWG 600-volt	lf	500	1.30	1.00
Pothead 7.5-kv	ls	1	300.00	245.00
Light fixt, incand type D	ea	7	20.00	70.00
T	ea	24	18.00	30.00
RLM fixt type X	ea	6	25.00	35.00

Road:

Bids: 12-1-54 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Clear, grub, cleanup	ac	26	1,200	675.00
Subgrade exc & embank.	lf	21,600	50.00	19.50
Culvert, 24"	lf	930	15.00	12.00
36"	lf	370	20.00	20.00
48"	lf	200	25.00	26.00
60"	lf	155	35.00	40.00
Ballast	lf	23,300	1.75	1.25
miscellaneous	cy	2,500	2.50	1.80
Crushed stone surf crse	t	3,000	4.00	2.80
stk-pile, Diablo	t	6,000	4.00	2.60
Newhalem.	t	5,000	3.00	1.75
Spot posts	ea	200	20.00	12.50
Tunnel:				
excavation	lf	1,130	300.00	200.00
steel bents & lagging	lb	20,000	0.40	0.60
cl 6 conc or rock bkfl behind lagging	cy	10	100.00	250.00
roof bolts	lf	1,000	2.00	2.20
Bridge				
approaches, exc.	cy	27,000	5.00	1.90
fndn, exc	cy	300	20.00	10.00
conc, fndn & abutment	cy	500	75.00	45.00
Reinf bars	lb	32,000	0.18	0.15
Drill stl dowel holes & grout in pl	lf	1,500	3.00	1.25
Msry or cl A conc in retaining walls	cy	3,500	40.00	25.00
Short span bridges	lf	220	175.00	75.00
Erect Gorge Creekbridge	ls	1	75,000	37,500

* Alt plastic p, freeze pts, not included

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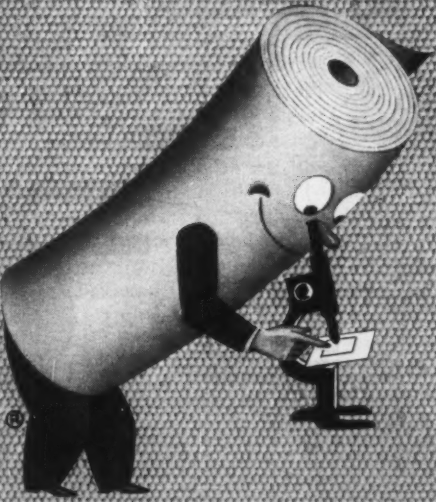

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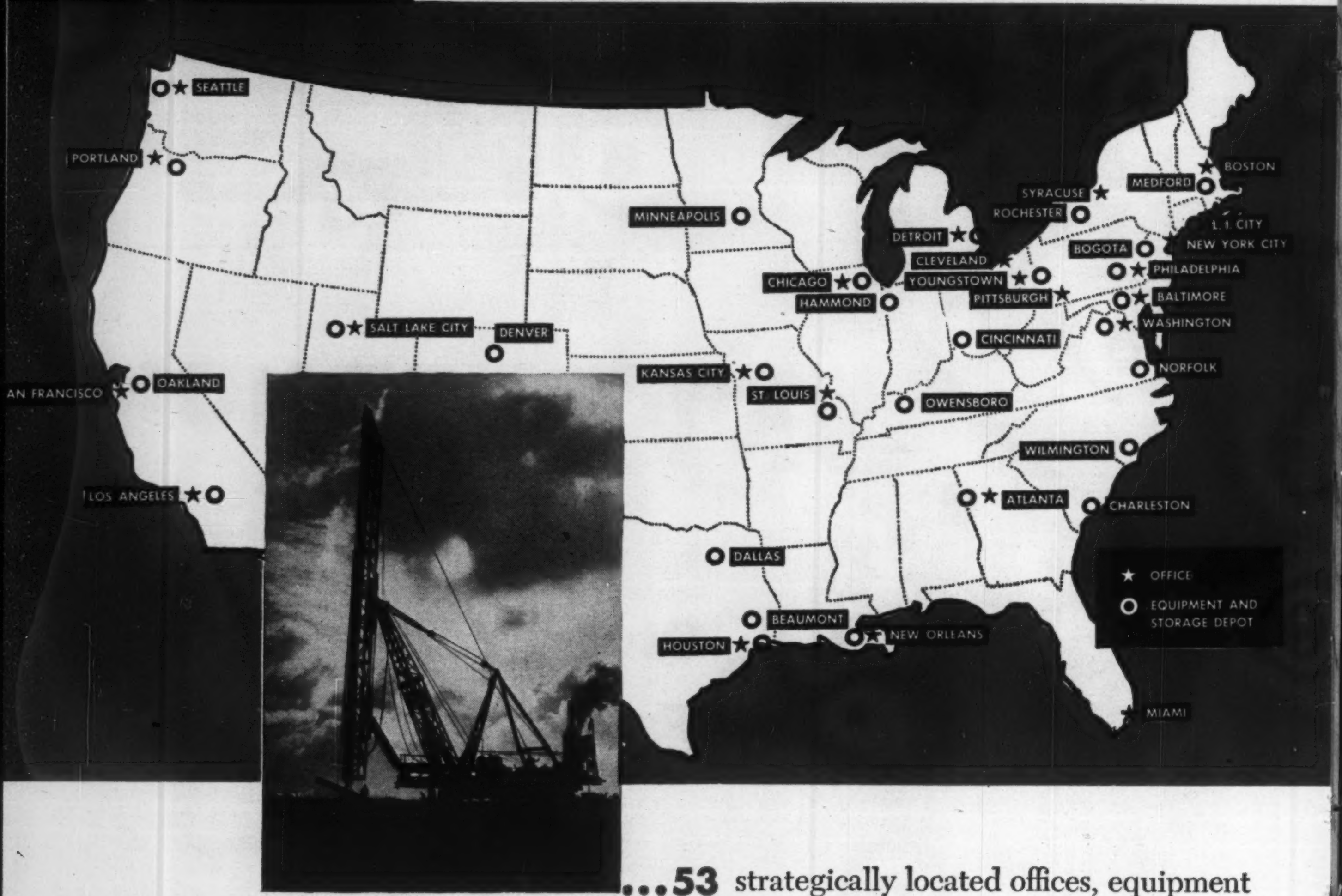

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BUSINESS AND FINANCE

Road Price Picture

Texas refines forecasting procedure to spot end of downtrend — California sees steady prices

Caught (with most of their contemporaries) between the needs of urgent road construction and the need to stretch dollars, Texas highway engineers were satisfied that a refinement in their price-trend estimating methods is apparently an accurate tool for predicting the future.

The refinement (see chart) was an application of the trend recognition method of George H. Petit (ENR Sept. 4, 1952, p. 98) to the department's long-standing highway bid price index.

Incidentally, the prediction isn't a particularly happy one: It shows an end to a year-long downtrend in highway prices in the state, and indicates a possible slow upward movement for the beginning of 1955.

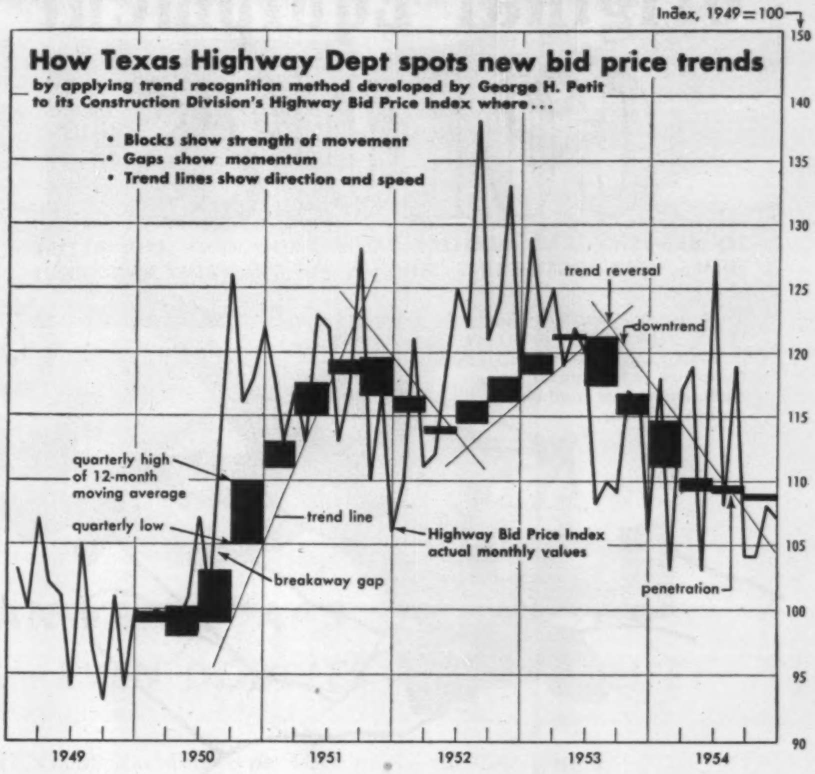
Bid prices in the state averaged 0.7% higher in the fourth quarter of '54 than in the third, although they were still well below—13%—the record high of 1952's fourth quarter. The prices, in fact, were at their lowest level since early in 1950, just before Korean hostilities sent all costs shooting upward.

• How to apply—The Texas Highway Department's regular index is based on a state-wide weighted average of prices bid on 11 different items (ENR Oct. 7, 1954, p. 123) which incude the following: excavation, base, type of pavement, reinforcing and structural steel.

The highway department's construction division used these averages to reprice a 1949 project valued at $100,000.

To measure momentum of the cost movement and spot changes in trends, the department's statisticians compute a quarterly 12-month moving average based on high and low bids submitted, thus arriving at the depth of the blocks shown on the chart. From the sizes of these blocks and the spaces between them each quarter, it is possible to recognize speeding or slowing of a trend, and thus to predict changes.

As indicated by year-end figures, the blocks had become extremely narrow, and had penetrated the trend lines previously drawn. This situation accurately forecast the slight upturn that has occurred.



• California sees no drop—Meanwhile, the California State Highway Department, reading its own carefully prepared price-trend statistics (which do not include the Petit refinement) saw little chance that prices would go down in 1955.

The California index did show a drop of 7.5% in the fourth quarter of '54 (under the third quarter). But the department's chiefs said they saw no more room for reducing labor costs at least in the immediate future. As a matter of fact, the department confidently expects labor costs to increase, despite the prospect of a large number of contracts for highway projects costing $1 million or more. In the past, such contracts have meant keen competition and resulted in lower bid prices being submitted.

Factors in the decline in California included drops in steel prices and the cost of excavation, which went down 16.6% and 18.5% respectively. Structural concrete prices also were off, by 7.1%.

In the same period, however, portland cement concrete paving costs were up 3.9% and plant-mixed surfacing rose by 3.2%.

Canadians See Good Business, Little Change in Prices

Although there are no signs of an end to a building boom that in 1954 showed a dollar volume 33% higher than in 1953, Canadian construction experts are forecasting little change in construction costs this year.

The Canadian Construction Assn., forecasting "general firmness" in the cost picture, said it was basing its prediction on the expectation that no marked changes would occur in the 1954 levels of on-site wage rates and building materials prices. In fact, said CCA, the prospect of continuing stiff competition will help stabilize prices.

Pressure for wage boosts should be less CCA, added, because gains in real wages have been substantial in recent years and consumer prices have been holding steady. The increase of long-term labor contracts, such as the one signed a few weeks ago to cover construction labor on the Canadian side of the St. Lawrence Seaway, also will be a factor in maintaining level prices.

• '54 figures up—Costs in 1954 averaged slightly higher for both residential and non-residential construction.

Indexes of residential and non-resi-

(Continued on page 238)

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dential building materials were lower, and although wage rates rose by a smaller amount than in preceding years, the average 1954 index of wage rates for on-site building trades workers increased by 4%. Paradoxically, CCA commented, owners in many instances paid less for construction than in 1953, despite a rise in basic construction costs, because of the increase in competition.

- **'55 prospects good**—The association—a broad-gage organization that includes all branches of the construction industry on a national basis—forecast a high volume of construction for 1955. It credited the predicted cost stability for optimism on the part of construction men and purchasers of construction.

Canada's continuing building boom—paced by a tremendous 146% rise in residential construction—has been an object of some awe throughout 1954. According to ENR's tabulations of construction volume (see also p. 61 of this issue) Canada's engineered construction volume for 1954 hit $1,282,357,000—a 33% jump over 1953. This record was achieved despite a drop of 41% during the year in industrial buildings.

Adding to the strength of CCA's forecasts for 1955 was ENR's Canadian backlog figure (see also p. 57). At the end of 1954 that backlog stood at $10.8 million—up 2% over 1953.

$100-Million Bridge Seen Feasible for Puget Sound

Washington's State Toll Bridge Authority this week was studying an engineering report that might be the beginning of the end of a long search for a means of building a vehicular crossing of Puget Sount.

The authority's consulting engineers, Coverdale & Colpitts, said a bridge would be economically feasible at either of two locations, and that regardless of location, the finished structure would cost more than $100 million.

Best route from a financial point of view, said the engineers, would extend from West Point (in Seattle's north end) to Skiff Point on Bainbridge Island. This structure would need secondary bridges to the Kitsap mainland. Second choice would be a bridge from Faulterloy (at the south end of the city) to the northern tip of Vashon Island, with a suspension bridge to connect the island with the community of Harper on the Kitsap shore.

(*B&F continued on page 240*)

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Industrial Building

Total is down sharply, but trend varies by industry

The industrial building trend was sharply downward during '54 with contract awards for privately owned plants reported by ENR dropping 41% below the high level that was reached in '53.

The number of awards also was off, but not as much as dollar volume. All told, 2,257 contracts were let last year for industrial plants costing $82,000 or more (ENR's minimum value for reporting industrial project contracts). This was 25% below the nearly 3,000 plant contracts awarded during 1953.

Big declines in contracts for public utility plants and metal refining and rolling accounted for most of the '54 drop in total industrial volume. Public utility contracts—mainly electric utilities—fell 50% in dollar volume and 29% in number of projects. Metal refining and rolling plants, mostly blast furnaces and steel mills, slumped 87% below '53 dollar volume although there were only 35% fewer projects. This reflects the completion of contract letting for the defense-inspired steel capacity expansion.

The process industries, which includes aluminum refining and rolling mills, cut back their contracts for new plants by 21% in dollar volume during '54 and 25% fewer new projects were let.

In contrast to the trend in these big basic production industries, the food industry set a new record in dollar volume and number of new plants awarded during '54. Dollar value of these contracts climbed 19% over '53 and the number of new plant awards increased 11%.

Also in the rise in '54, were machinery and machine parts plants where dollar volume of contracts rose 18% over '53. However, the number of plant awards dropped below both '53 and '52. Aircraft production plants rose 43% over dollar value in '53, although the number of projects was a little lower than in the previous year. Both machinery and parts, and aircraft plant awards were well below the '52 level despite the '54 rise.

Public unclassified construction scored big gains in '54. But private unclassified dropped off, as pipeline and transmission line construction declined.

Federal airport construction—mainly military, rose nearly 11% over '53. Most of this increase was in runways and taxiways.

Business Briefs . . .

- **Milwaukee bonds**—A syndicate of J. P. Morgan & Co. and two other houses was low bidder on $15.5-million Milwaukee County bonds that will pay for improvements to county institutions, parks and the metropolitan sewerage system. The combine bid an interest rate of 1.4332% for the bonds.

- **Construction dividends**—For the first time in its corporate history, Utah Construction Co., has made public its earnings. Overall net profits, said the firm, were $3.9 million (for the year ended October 1954); equal to $4.51 a share. That compares with $3.37 a share in 1953.

Variation of expenditures by industries is clearly shown in accompanying table.

Industrial building contracts drop in '54

Increases in machinery & parts, food and aircraft plants are offset by sharp declines in metal refining & rolling, process industries and public utilities; food plants set new high

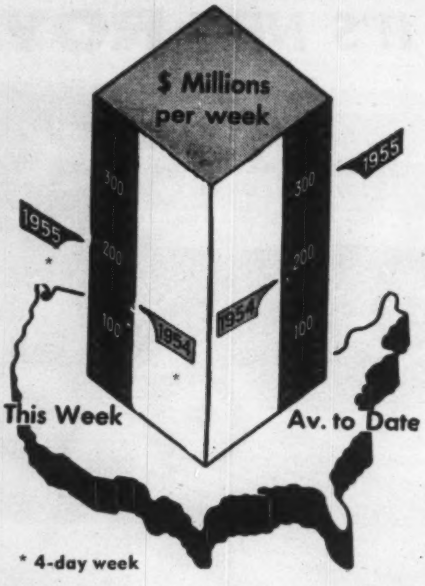
Industry	1952 No.	1952 Value	1953 No.	1953 Value	1954 No.	1954 Value
Transportation Service						
Railroad	48	$22,283,000	64	$27,620,000	18	$10,485,000
Automotive	173	34,798,000	240	55,515,000	152	41,393,000
Public Utilities	116	405,560,000	123	700,921,000	87	348,037,000
Process Industries[1]	574	1,271,693,000	551	917,737,000	414	728,686,000
Food Industries[2]	270	102,434,000	368	151,580,000	407	180,357,000
Metal Refining & Rolling	39	281,440,000	37	573,287,000	24	72,939,000
Metal Working Plants						
Auto Factories	28	55,674,000	33	282,935,000	27	36,065,000
Aircraft Factories	44	63,637,000	38	29,165,000	35	41,855,000
Foundries	12	2,733,000	17	2,191,000	8	1,687,000
Mach.&Mach.Parts	459	265,256,000	471	186,086,000	369	218,806,000
Radio & TV & Electronics	16	14,292,000	28	24,801,000	17	5,901,000
Textiles (excl. rayon)	78	20,730,000	91	27,845,000	45	20,185,000
Wood Industries	54	18,449,000	55	8,568,000	49	13,638,000
Miscellaneous						
General Factories	728	163,045,000	866	181,359,000	595	153,667,000
Refrig. & Cold Stor.	3	345,000	16	8,519,000	10	2,608,000
Total, priv. financed	**2,642**	**$2,722,369,000**	**2,998**	**$3,178,129,000**	**2,257**	**$1,876,309,000**
Fed. Owned Indus. Plts.	264	$2,870,745,000	190	$276,037,000	151	$183,260,000

[1] Includes distilleries

[2] Includes breweries, frozen food plants and lockers.

Activity This Week

As reported to ENR
(in millions of dollars)



* 4-day week

Amount of contracts let

	This Week	Cumulative 7 wks 1955	Cumulative 7 wks 1954	% chge
Federal	$20.8	$241.2	$117.8	+105
State and municipal	42.9	555.2	494.7	+12
Total public	63.7	796.4	612.5	+30
Total private	130.2	1,271.6	694.7	+83
U. S. Total	$193.9	$2,068.0	$1,307.2	+58

Contracts by type of work

	This Week	Cumulative 7 wks 1955	Cumulative 7 wks 1954	% chge
Waterworks	$7.0	$42.6	$25.5	+67
Sewerage	4.2	48.8	29.1	+68
Bridges	2.3	64.6	42.9	+51
Highways	15.5	211.8	156.7	+35
Earthwork, waterways	1.3	58.3	34.9	+67
Buildings:				
Public, excl. hsg.	13.8	209.0	194.0	+8
Housg., public	0.3	8.0	29.1	−87
Housg., private	77.0	761.0	344.6	+121
Commercial	20.6	148.1	138.7	+7
Industrial	27.6	309.3	186.7	+66
Unclassified	24.3	206.5	125.0	+65
Total	$193.9	$2,068.0	$1,307.2	+58

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

New capital for construction

(millions of dollars)

	Week of Feb. 10 1955	Cumulative 6 wks 1955	Cumulative 6 wks % chge '54-'55
Corporate securities	$38.1	$303.2	−23
State and municipal:			
All except housing	56.6	400.5	+36
Housing	1.4	32.4	+206
Federal loans	...	8.0	−52
Federal aid	...	...	...
Total non-federal	$96.1	$744.1	+4
Federal appropriations:			
In U. S.	...	...	...
Outside U. S.	...	...	...
Total new capital	$96.1	$744.1	+4

ENR cost and volume indexes, 1955

		Base years = 100 1913	1926	1949
Construction cost	2/10	645.94	310.50	135.41
	2/3†	645 84	310.46	135.39
Building cost	2/10	459.53	248.41	130.63
	2/3†	459.43	248.35	130.60
Volume	Jan.	560	228	162
	Dec.	464	189	134

† Official monthly index for Feb. 1

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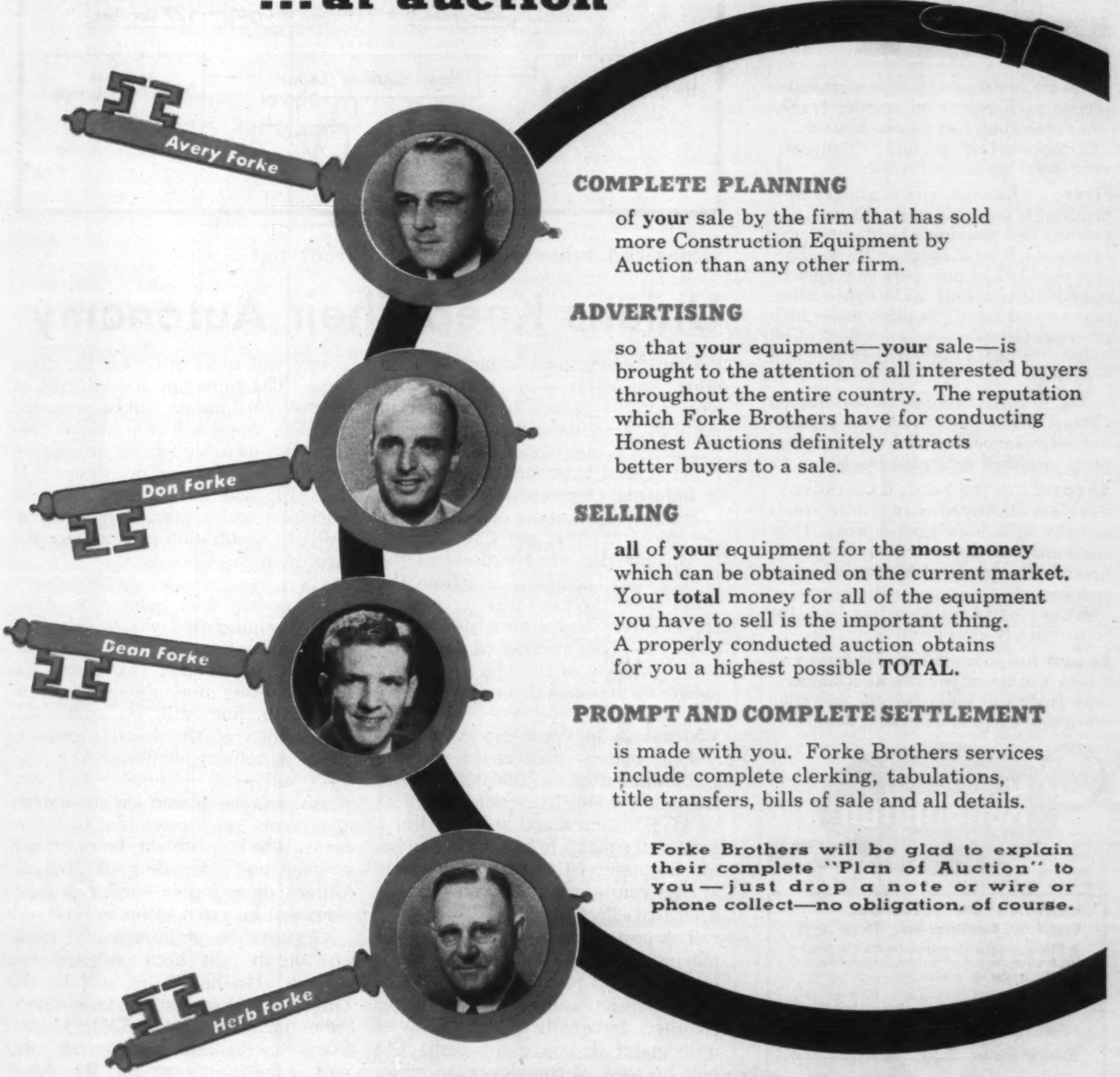

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Model________ No. tracks per belt________
Width of grouser________
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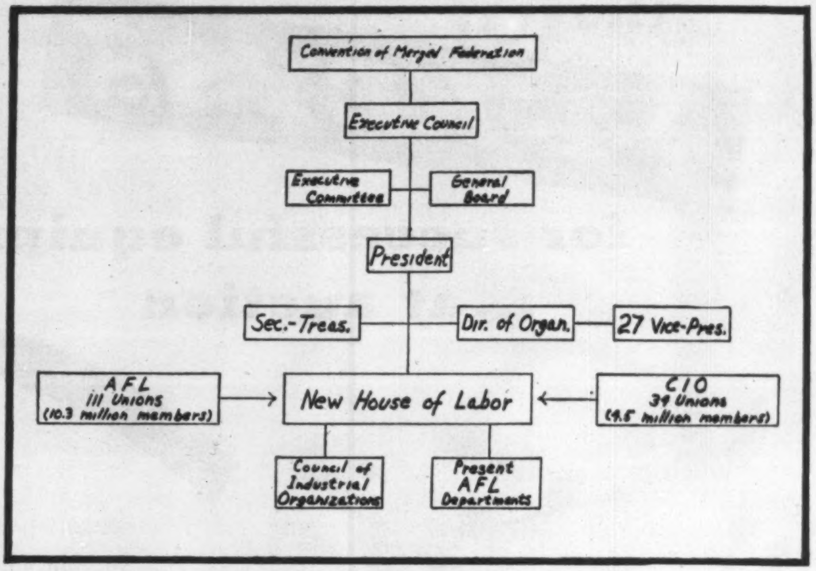
COMPANY________
ADDRESS________
CITY________ ZONE________
STATE________



Organized labor builds a solid front but . . .

Unions Keep Their Autonomy

Construction men along with all other employers—were waiting this week for the unions to spell out in detail the exact meaning of the heavily publicized re-marriage of the American Federation of Labor and the Congress of Industrial Organizations.

Pending ratification of the merger agreement by AFL and CIO conventions, only the broad outlines of the merger were apparent. And from the broad view, the joint merger committee members had apparently done a good job. They overlooked very little and met many of the objections to a merger of two such dissimilar bodies.

• Meany in top post—No employer—and no worker—could doubt that the establishment of a 15,000,000-member federation would have profound effect on U. S. business and politics. But a great deal remains to be sketched in before an industry that sprawls as widely as does construction will know exactly what that effect would be.

Top post in the new federation, yet unnamed, goes to George Meany, AFL president who rose from the ranks of the plumbers union. CIO's Walter Reuther, apparently for the sake of unity gracefully bowed out—perhaps to bide his time. A complex organization scheme, lodging supreme authority in the federation convention, seeks on the surface to preserve the relative balance of power between the two unions.

To the rank and file member, merger will mean little for the time being. The autonomy and integrity of the individual unions will be preserved and each union will continue to conduct its own collective bargaining negotiations. Existing departments of the AFL will be continued in the federation and a new Council of Industrial Organization will preserve the identity of the CIO unions.

• Anti-raiding pact holds—The AFL-CIO no-raiding pact will be inherited by the federation and, if all goes well, extended for another two years. Efforts to bring non-subscribing members into line will be continued. Preservation of the separate jurisdictional agreements between AFL and CIO unions is planned. And emphasis will be placed on "voluntary agreements" as the solution to future feuds. The constitution, however, will contain an anti-raiding declaration. Unions operating in similar jurisdictions will be urged to merge.

Organization of unorganized workers already has been assigned top priority. Heading it up, will be the Director of Organization, to be drawn from the ranks of the CIO. Undertaken "in the common interest," the goal is the most powerful labor front in history.

To some, this new concentration of labor power was deeply disturbing. The evils of monopoly, of power, and of compulsion were heard again. On most fronts the reaction was favorable. Said Sen. Lister Hill, Alabama Democrat and chairman of the Senate Labor Committee: "It's good. It's good for the members of the unions, good for labor-management relations, and good for the country."

Following approval by the CIO executive board this week, drafting of the constitution will get under way. The long series of subsequent approvals is a foregone conclusion. Final action lies in the hands of a joint convention, following the unions' annual conventions next fall.

Louisville Building Trades Launch Disputes Settlement

With the formation of a committee in Louisville, Ky., for the settlement of jurisdictional disputes, labor leaders in the AFL building trades have taken another step toward solution of one of labor's major problems on the local level.

The new plan, adopted by 17 of the 19 building trades, has already been used for settlement of three disputes.

It creates a Louisville Jurisdictional Disputes Committee, consisting of one representative from each of the consenting unions. Under the agreement, the committee selects an impartial referee to hold hearings and decide interunion disputes over job assignments. Decisions of the referee may be appealed to the National Joint Board for the Settlement of Jurisdictional Disputes. A planning and policy board, elected from committee members, acts as an executive group.

Labor Briefs . . .

• **Nike trouble**–Cisco Construction Co., Portland, Ore., is being sued by the government on behalf of a subcontractor for damages arising out of West Coast Nike site construction (ENR Nov. 18, 1954, p. 158). Cisco had declared the sub in default for failure to meet the completion date and the sub claims Cisco itself provoked the work stoppage by using nonunion labor.

• **Resistance**–A strong alliance of Arizona contractors, headed by AGC, will try to roll construction wages back when the five-year AFL building trades contract expires May 31. They contend high wage rates are no longer justified under present living costs and unduly penalize construction buyers.

OFFICIAL PROPOSALS

Bids: March 1, 1955

Pennsylvania Turnpike Commission Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 11 North Fourth Street, Harrisburg, Pennsylvania, until 10:00 a.m., Eastern Standard Time, the 1st day of March 1955, and immediately thereafter will be taken to the Public Utility Commission's Hearing Room No. 1, North Office Building, State Capitol, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contract:

For the construction of structures and the grading, drainage and paving of the Turnpike Section 36E, part of the Northeastern Extension of the Pennsylvania Turnpike in East Penn and Mahoning Townships, and Parryville Borough, Carbon County, Commonwealth of Pennsylvania. This section being situated as follows:

Beginning at a point approximately 4282 lineal feet southeast of the center line intersection of the Turnpike and the main track of the Lehigh and New England Railroad at Turnpike station 32+12.56 in East Penn Township, Carbon County; thence in a northwesterly direction, omitting the portion of Construction Section 36EF between Turnpike stations 167+75.24 and 182+72.03, to Turnpike station 191+00 at a point approximately 900 lineal feet northwest of the center line intersection of L. R. 163, T. R. 29, in Parryville Borough, Carbon County, a distance of approximately 2.73 miles.

The approximate quantities of the principal items are as follows:

Class I Excavation	1,129,200 cu. yds.
Class II Excavation	16,879 cu. yds.
Class 2A Excavation	5,209 cu. yds.
Special Subgrade	114,189 sq. yds.
Reinforced Concrete Pavement	73,810 sq. yds.
Class A Concrete	3,500 cu. yds.
Class B Concrete	5,515 cu. yds.
Plain Steel Bars	831,490 lbs.
Fabricated Structural Steel	1,561,870 lbs.
Median Divider	12,975 lin. ft.
Cast-in-Place Concrete Piling	2,340 lin. ft.

Copies of plans, specifications and other contract documents, including cross-sections, are on file and open to public inspection at the office of the Pennsylvania Turnpike Commission located at Harrisburg, Pennsylvania, on 15 February 1955. Plans, specifications, cross-sections and other contract documents will be available by this date for inspection or for mailing to prospective bidders. Copies of Specifications for grading, drainage, paving and structures may be purchased from the Pennsylvania Turnpike Commission for the sum of five (5) dollars per copy. Copies of cross-sections may be purchased from the Pennsylvania Turnpike Commission for the sum of fifty (50) dollars per set.

Plans and contract documents, for this section exclusive of cross-sections and specifications, may be purchased from the Pennsylvania Turnpike Commission for the sum of twenty (20) dollars for each set. No refund will be made for plans returned unless the project is withdrawn from letting by the Pennsylvania Turnpike Commission.

Remittances are payable by check or P.O. money order to the Pennsylvania Turnpike Commission and must accompany requests for drawings, specifications, contract documents, and cross-sections.

The character and amount of bid security to be furnished by the bidder is stated in the Instructions to Bidders.

The Commission reserves the right to waive any informalities in or to reject any or all bids.

No bids may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

PENNSYLVANIA TURNPIKE COMMISSION
James F. Torrance
Secretary and Treasurer
Harrisburg, Pennsylvania
7 February 1955

OFFICIAL PROPOSAL

RATE: $1.80 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: March 15, 1955

Power Authority of The State of New York

ST. LAWRENCE POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF
150 TON AND 210 TON GANTRY
CRANES
SPECIFICATIONS NO. PA-5-15075
ST. LAWRENCE CONTRACT NO. P6

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture, and furnishing of two (2) 150 ton gantry cranes and (2) 210 ton gantry cranes and delivery thereof f.o.b. destination, until 10:30 A.M. Eastern Standard Time on the 15th day of March, 1955 at the Authority's office, 270 Broadway, Room 1207A, New York 7, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be entertained for 2 or 4 gantry cranes and associated equipment and services in accordance with the bidding schedules. Erection at the site of installation will be done by others but services of an erection engineer shall be provided by the manufacturer, if and when required.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's Office after January 28, 1955 and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications and Proposal Forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1207A, New York 7, New York after January 28, 1955 upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents and Five ($5.00) dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. A bid deposit will be required with each bid in an amount not less than 10 percent of the maximum price bid for any bid schedule.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: March 22, 1955

Contract LT-160.014

THE PORT OF NEW YORK AUTHORITY
LINCOLN TUNNEL—THIRD TUBE
WIDENING OF ROADWAY
FROM
KINGS BLUFF TO HUDSON COUNTY
BOULEVARD EAST IN NEW JERSEY

Sealed proposals for the widening of the Lincoln Tunnel Approach Helix Roadway from Kings Bluff to Hudson County Boulevard East in Weehawken, New Jersey, will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, March 22, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of the documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, February 17, 1955

Bids: February 24, 1955

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 24th day of February 1955, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee Street, Utica, N. Y. DISTRICT No. 3, William Robinson, District Engineer, 301 E. Water Street, Syracuse, N. Y. DISTRICT No. 4, E. G. H. Youngmann, District Engineer, Barge Canal Terminal, Rochester, N. Y. DISTRICT No. 5, C. R. Waters, District Engineer, 65 Court Street, Buffalo, N. Y.						
Oneida, Madison, Cayuga, Seneca, Onondaga, Genesee, Monroe, OnPtario, & Erie	T.T.S. 55–1	New York State Thruway Mohawk and Ontario Sections		Furnishing and Installing 7,000 Roadside Delineators	$1,700 Plans $10	$31,000

N.B.: lans and Proposals for the above contract will be distributed only from our Albany and New York City Offices — but will be exhibited for examination at our District 2, 3, 4, and 5 offices where work is located.

DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee Street, Utica, N. Y.						
Oneida	M.T. 55–1	New York State Thruway—Mohawk Section—Sub. 6 (Westmoreland Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work..................	$12,000 Plans $10	226,000
DISTRICT No. 3, William Robinson, District Engineer, 301 E. Water Street, Syracuse, N. Y.						
Cayuga	O.T. 55–2	New York State Thruway—Ontario Section—Sub. 4 (Port Byron Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$12,000 Plans $10	224,000
Onondaga	O.T. 55–1	New York State Thruway—Ontario Section—Sub. 7 (Warners Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$12,000 Plans $10	225,000
Onondaga	M.T. 55–2	New York State Thruway—Mohawk Section—Sub. 8B (East Syracuse Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$15,000 Plans $10	268,000
DISTRICT No. 4, E. G. H. Youngmann, District Engineer, Barge Canal Terminal, Rochester, N. Y.						
Genesee	O.T. 55–5	New York State Thruway—Ontario Section—Sub. 2 (East Pembroke Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$13,000 Plans $10	233,000
Monroe	O.T. 55–4	New York State Thruway—Ontario Section—Sub. 8A (Scottsville Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$9,000 Plans $10	170,000
Ontario	O.T. 55–3	New York State Thruway—Ontario Section—Sub. 12 (Victor Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$12,000 Plans $10	220,000
DISTRICT No. 5, C. R. Waters, District Engineer, 65 Court Street, Buffalo, N. Y.						
Erie	O.T. 55–6	New York State Thruway—Ontario Section—Sub. 15 (Clarence Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$10,000 Plans $10	175,000
DISTRICT No. 8, J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Orange	C.T. 55–1	New York State Thruway—Catskill Section—Sub. 5 (Modena Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$12,000 Plans $10	218,000
Orange	C.T. 55–2	New York State Thruway—Catskill Section—Sub. 5 (Plattekill Gas Station & Restaurant Site)	....	Grading, Paving & Misc. Work	$13,000 Plans $10	227,000
Orange	C.T. 55–3	New York State Thruway—Catskill Section—Sub. 5 (Newburgh to New Paltz) Union Ave. Highway Grade Separation (Co. Rd.)	0.30	Asph. Conc. Opt. Hgs Comp. I-Beam 292.4′	$14,000 Plans $10	255,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders."

The right is reserved to reject any or all bids.

John W. Johnson
SUPT. OF PUBLIC WORKS

Bids: March 22, 1955

Power Authority of the State of New York

ST. LAWRENCE POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF 86,000 KVA SINGLE PHASE POWER TRANSFORMERS
SPECIFICATIONS NO. PA-4-14002
ST. LAWRENCE CONTRACT NO. P7

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture and furnishing of 86,000 kva, single phase power transformers and delivery thereof f.o.b. Massena, New York, until 10:30 a.m. Eastern Standard Time, March 22, 1955, at the Authority's office, 270 Broadway, Room 1207A New York 7, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be entertained for 13, 7, 6 or 1 power transformers and associated equipment and services in accordance with the bidding schedules. Erection at the site of installation will be done by others but services of erection engineers shall be provided by manufacturers if and when required.

Bids will not be restricted to American manufacturers.

Plans, specifications and proposal forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications, and proposal forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1207A, New York 7, New York, upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents and Five ($5.00) dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. Guarantee will be required with each bid in an amount not less than 10 percent of the maximum price bid for any schedule.

The right is reserved to reject any or all bids.

W. S. CHAPIN
PA-4-14002 GENERAL MANAGER

Bids: March 8, 1955

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR
CONSTRUCTION OF
PERMANENT SECTION OF ROBINSON TUNNEL ROAD NEAR MASSENA, ST. LAWRENCE COUNTY, NEW YORK
SPECIFICATION NO. PA-5-11006
ST. LAWRENCE CONTRACT NO. 12

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of the Permanent Section of Robinson Tunnel Road and appurtenant works near Massena, St. Lawrence County, New York until 2:30 P.M. Eastern Standard Time on the 8th day of March, 1955 at the Authority's office, 270 Broadway, Room 1207-A, New York 7, New York, at which time and place proposals will be publicly opened and read aloud.

The principal items of work are:

Estimated:		
131,700	cu. yd.	Excavation, Road and Highway
74,800	cu. yd.	Embankment, Road and Highway
3,600	lin. ft.	Highway Guard Rail
730	lin. ft.	Reinforced Concrete Culvert Pipe (various sizes)
110	cu. yd.	Dry Rip Rap
17,700	cu. yd.	Bank Run Gravel
2,400	cu. yd.	Filled Stone Base Course
3,500	tons	Bituminous Macadam
3,335	tons	Asphalt Concrete (two types)
800	cu.yd.	Stabilized Shoulders

The work shall be completed on or before July 15, 1955.

Plans, specifications and proposal forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications and proposal forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1207A, New York 7, New York, upon application and prepayment of a fee of Twenty-five ($25.00) dollars per initial set and Ten ($10.00) dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. Each proposal must be accompanied by draft or certified check payable to the order of Power Authority of the State of New York for the sum of $30,000.00.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

U. S. Government

GOV. OF DIST. OF COL., DEPT. OF HIGHWAYS, Feb. 4, 1955. SEALED PROPOSALS will be recd. in Rm. 404, 499 Pa. Ave., N.W., Wash. 1, D. C., until 2 PM, EST, Feb. 25, 1955, and then publicly opened and read for Grading, Storm Sewer Drainage, and Paving the West Approaches to the East Capitol Street Bridge and Bridge Wearing Surface from 19th Street to Anacostia Avenue, Federal Aid Project F-42(15), Contract No. 1C; consist. of 15,210 cu. yds. excavation; 66,700 sq. yds. sheet asphalt pavement; 200 tons asphaltic conc.; 2,100 lin. ft. guard rail; 24,150 lin. ft. cem. conc. curb; 6,870 sq. yds. cem. conc. sidewalk; 50,000 sq. yds. cem. conc. rdwy base; 9,887 lin. ft. R/C sewer pipe; 552 cu. yds. conc. for outfall sewer; 48,500 lbs. reinf. steel; and 45 cu. yds. brick masonry for outfall sewer. Proposal forms, plans and specns. obtainable from Supervisor, Contr. & Bond Section, upon deposit of a Certified Check for $50.00 per set, payable to Collector of Taxes, D. C., 499 Penn Ave., N.W., Rm. 406, Procurement Office, D. C. (NA 8-6000, Ext. 2378).

OFFICIAL PROPOSALS

Bids: March 10, 1955

County of Hudson

NOTICE TO CONTRACTORS

Sealed bids will be received by The Board of Chosen Freeholders of the County of Hudson on

THURSDAY, MARCH 10, 1955

at 11:00 A.M., EST., in the Freeholders' Assembly Chamber at Hudson County Court House, Newark Avenue, Jersey City, New Jersey, for the following contracts for construction of the Hudson County Administration Building, Jersey City, New Jersey—

Contract No. 2—General Construction Work.

Contract No. 3—Structural Steel and Ornamental Iron Work (Titled in Specifications as Structural Steel and Miscellaneous Iron Work).

Contract No. 4—Plumbing and Gas Pitting and Kindred Work (Titled in Specifications as Plumbing Work).

Contract No. 5—Steam and Hot Water Heating and Ventilating Apparatus Work (Titled in Specifications as Heating and Ventilating Work).

Contract No. 6—Electrical Work.

Contract No. 7—Elevator Work.

in accordance with drawings, specifications, alternates and addendums obtained at the office of Mascolo & Masumian, Architects, Room #703, 880 Bergan Avenue, Jersey City, New Jersey, upon deposit of $50.00 per set in the form of certified check, which deposit will be refunded upon return of drawings, specifications, alternates and addendums in good condition and intact to the Architects. Blank Proposal forms to be obtained with each set.

Each bid must be accompanied by (a) cash or certified check payable to the order of Treasurer of the County of Hudson in a sum equal to ten per cent of the bid, the deposit to be subject to the conditions in the specifications; (b) a certificate from a surety company authorized to do business in New Jersey, that such company will provide the bidder with bond or bonds called for in the specifications, and in the amount of the contract price; (c) a certificate, as required by the specifications, showing that the bidder owns, controls or will control all necessary equipment; and (d) a written statement of the bidder setting forth his present financial position and prior experience in doing such work as must be done to execute the tasks required by the plans and specifications.

Bids must be enclosed in sealed envelopes endorsed in the follow manner: "Proposal for Contract No. 2—General Construction Work, Hudson County Administration Building", and similarly for other contracts, and handed to the Clerk of the Board of Chosen Freeholders in open meeting on March 10, 1955 when called for in the order of business transacted. No bid will be received previous to the hour aforesaid, and none will be received thereafter. At such time and place all bids received will be unsealed immediately, the contents thereof will be publicly announced and a proper record of the bids and terms will be made upon the minutes of the Board.

Attention of bidders is called to the existence of statutes and regulations relative to safety of workmen, hours of labor, workmen's compensation insurance, preference for and prohibition of certain types of labor, anti-discrimination against labor, and other particular statutes and regulations affecting the proposed public work, together with regulations, rules and ordinances of the municipality in which the work is to be done. One submitted, no bid can be withdrawn without consent of the Board of Chosen Freeholders, and the said Board of Chosen Freeholders reserves the right to reject any and all bids to waive any defects in the bids or bid proposals when it is deemed advisable to do so.

JOSEPH B. CULLOO, Clerk.
Board of Chosen Freeholders.
County of Hudson, N. J.

Contractors Watch
This Section—

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

OFFICIAL PROPOSALS

Bids: March 4, 1955

Construction of River Piers

NOTICE TO CONTRACTORS
OF STATE HIGHWAY CONSTRUCTION
BIDS TO BE RECEIVED
March 4, 1955

Sealed bids will be received by the State of Tennessee Department of Highways and Public Works at their offices in the Cotton States Building, Nashville, Tennessee, until 10:00 O'Clock A.M. March 4, 1955

HAMILTON COUNTY:

Project No. U-072-1-(3)—The construction of four (4) river piers for a proposed bridge across the Tennessee River in Chattanooga, approximately 2000′ west of the existing Market Street Bridge on Urban Route No. 72.

Working Days—400

(Unloading Point—Chattanooga)

No Proposals will be issued after 4:30 P. M., Thursday, March 3, 1955

THE ATTENTION OF THE BIDDER IS DIRECTED TO CHAPTER 135, ACTS OF 1945

Contractor must prequalify with the Department of Highways and Public Works in accordance with Chapter 80 of the Public Acts of 1929, before any Proposals will be furnished. PROSPECTIVE BIDDERS MUST HAVE FILED THEIR QUESTIONNAIRES FOR QUALIFICATION FIVE (5) DAYS BEFORE THE DATE OF LETTING. The right to reject any and all bids is reserved.

W. M. Leech
Commissioner

Bids: March 10, 1955

State of Maryland

STATE ROADS COMMISSION
NOTICE TO CONTRACTORS

SEALED PROPOSALS for the following contract:

PATAPSCO TUNNEL PROJECT
BALTIMORE CITY—CONTRACT P. T. 108
—RIVER TUNNEL AND SHAFTS

Construction of the River Tunnel and Shafts of the Patapsco Tunnel Project in Baltimore City. The Tunnel extends from a point on the south shore of the Patapsco River, approximately 0.2 mile east of Childs Street in Fairfield, Baltimore City, to a point on the north shore of the Patapsco River, immediately east of Clinton Street in Canton, Baltimore City.

The River Tunnel is a subaqueous two-tube, four-lane vehicular tunnel crossing the Patapsco River between ventilation shafts in Canton and Fairfield, a distance of approximately 6,300 feet. It is to be constructed of 21 prefabricated tunnel sections, each approximately 300 feet long.

The two ventilation shafts are steel and reinforced concrete structures on pile foundations and will be constructed in the dry in excavations made from the surface. The construction of the Fairfield Ventilation Shaft will include foundations and the first floor of the Fairfield Ventilation Building, the remainder of which building will be constructed under another contract.

The work under this contract also includes the roadway paving for the Tunnel and for the land sections immediately adjacent thereto.

The employment agency for furnishing labor on the above contract is: MARYLAND STATE EMPLOYMENT SERVICE, 41 HOPKINS PLACE, BALTIMORE, MARYLAND.

will be received by the State Roads Commission at its offices, 108 East Lexington Street, Baltimore 3, Maryland, until 12 Noon E.S.T. on the 10th day of March, 1955, at which time and place they will be publicly opened and read. QUALIFICATION OF BIDDERS REQUIRED.

Bids must be made upon the blank proposal form which, with specifications and plans, will be furnished by the Commission upon application and cash payment of $40.00 for each separate project. NO REFUND WILL BE MADE FOR RETURN OF SPECIFICATIONS AND PLANS.

No bids will be received unless accompanied by a certified check or bid bond payable to the State Roads Commission of Maryland, in the amount as set forth in the proposal form, as required by Section 13, Article 89B, Annotated Code of Maryland, 1951 Edition.

The successful bidder will be required to give bond and comply with the Acts of the General Assembly of Maryland respecting contracts.

The Commission reserves the right to reject any and all bids.

BY ORDER of the State Roads Commission this 1st day of February, 1955. C. R. PEASE, Secretary, RUSSELL H. McCAIN, Chairman

OFFICIAL PROPOSALS

Bids: March 10, 1955

New Jersey Turnpike Authority

CONTRACT NO. N-26C

Proposals are invited for Contract No. N-26C which involves the construction of the substructure, consisting of twenty-four (24) piers, two abutments and two retaining walls, for a portion of the North Terminal Ramps—Section B, in Jersey City, Hudson County, New Jersey, all in connection with the construction of the Newark Bay-Hudson County Extension of the New Jersey Turnpike.

The principal items of work include:

Open Foundation Excavation	2,300 cu. yds.
Concrete	3,430 cu. yds.
Reinforcement Steel	280,000 lbs.
Treated Timber Piles	4,400 lin. ft.
Drilled-In Caissons	5,575 lin. ft.
Structural Steel Cores (in Caissons)	640,000 lbs.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 O'Clock Eastern Standard Time on the morning of March 10, 1955, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours after February 14, 1955, at the office of the Authority and at the office of the Consulting Engineer, Howard, Needles, Tammen & Bergendoff, 55 Liberty Street, New York 5, New York. Contract documents will be furnished upon payment of Fifteen Dollars ($15.00) for each set, upon application to the Authority. Contract documents are not required to be returned and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast, Chairman
February 10, 1955

Bids: March 1, 1955

Contract NYA-140.029

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
BOUNDARY FENCE—VARIOUS LOCATIONS

Sealed proposals for the furnishing and installation of chain link fence at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y. until 2:30 P.M. on Tuesday, March 1, 1955, at which time and place said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, February 17, 1955

COMMONWEALTH OF MASSACHUSETTS. Department of Public Works. NOTICE TO CONTRACTORS: Sealed proposals for State Highway and Bridge Construction in the Towns of ORANGE and ATHOL will be received at Room 427, 100 Nashua Street, Boston, Mass., until 2:00 P.M. of Tuesday, March 1, 1955 and at that place and time publicy opened and read. Proposal guaranty: $50,000. Charge for plans and proposal forms: $25.00, amount returnable only to bidders. Complete information at said office; plans on display at District offices. Minimum wage and dump-truck rates have been established. Right reserved to waive any informality in or reject any or all proposals. An award will not be made to a Contractor who is not equipped to undertake and complete the work.

By: JOHN A. VOLPE,
Commissioner of Public Works.
February 12, 1955.

CLASSIFIED **SEARCHLIGHT SECTION** ADVERTISING

EMPLOYMENT • BUSINESS • **OPPORTUNITIES** • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
(Not available for equipment advertising)

$1.80 cents a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

POSITION WANTED undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.80 a line an insertion.

INFORMATION:

BOX NUMBERS count as 1 line additional in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED or FOR SALE Advertisements acceptable only in Displayed Style.

DISPLAYED—RATE PER INCH:

The advertising rate is $20.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

Send NEW ADVERTISEMENTS: To New York Office, 330 W. 42nd St., N. Y. 36 for March 3rd issue closing February 21st.

THE AUSTIN COMPANY

Offers Opportunities to Qualified Engineers and Draftsmen

Positions are open to capable engineers and draftsmen who can design and/or prepare plans and specifications for complete industrial plants, all related structures, and building equipment falling within the following categories:

DESIGNERS—Office buildings, laboratories, and industrial buildings. Positions require those possessing vision and creativeness.

STRUCTURAL—Industrial buildings and miscellaneous structures of steel and reinforced concrete.

MECHANICAL—Heating, air conditioning, ventilation systems, process piping, conveying systems, plumbing, sewer, and sprinkler systems.

ELECTRICAL — Industrial lighting and power distribution and controls.

DETAILERS—Structural steel fabrication for industrial buildings.

Assignments are in connection with our long-established offices located on the East coast and Midwest areas. Desirable working conditions, established vacation and sick leave plans, also paid holidays.

Full particulars as to education, experience, and compensation desired should be given in first letter.

NATIONAL HEADQUARTERS
16112 Euclid Ave. Cleveland 12, Ohio

ENGINEERS

Designers Detailers Draftsmen for work on Bridges, Expressways, Turnpikes

PERMANENT POSITIONS DEPENDING ON EXPERIENCE AND ABILITY

PAID VACATION, SICK LEAVE HOSPITALIZATION, LIFE INSURANCE

INCLUDE EDUCATON, EXPERIENCE, REFERENCES AND SALARY EXPECTED IN APPLICATION LETTER

Howard, Needles, Tammen & Bergendoff
1805 GRAND AVE. KANSAS CITY 8, MO.

SALES OPPORTUNITY:

COMMERCIAL INSTITUTIONAL ALUMINUM WINDOW MFR. WANTS NEW YORK MANAGER TO PROMOTE IN SPECIFICATION STAGE WITH ARCHITECTS. EXPERIENCE IN SPECIALTY SELLING TO ARCHITECTS REQUIRED.

SW-5467, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

RELIABLE FIELD man: unusual opportunity for good sound construction man as field supervisor and trouble-shooter for prestressed concrete construction. Practical, with some engineering fundamentals and mechanical abilities. Advancement unlimited. Must accept responsibilities willingly. Personal habits beyond reproach. Location Southwest. State experience, salary expected, willingness to travel anywhere, availability, references. P-5236, Engineering News-Record.

SUPERINTENDENT—COMPLETE knowledge of road construction and bituminous paving. Must be able to estimate and take charge of complete road job. Year around position with reliable construction company in Central New York, P-5413, Engineering News-Record.

ENGINEER EXPERIENCED in triangulation and construction surveys for work in north central states. Send record resume, reference and salary requirement to P-5397, Engineering News-Record.

WANTED: BRIDGE & Highways designers with office and field experience by consulting engineering firm in Pennsylvania. Give complete details and salary desired. P-5389, Engineering News-Record.

GRADUATE STRUCTURAL or Civil Engineer, experienced in elevated water tank business preferred, to provide administrative, executive sales and general office assistance to Mid-Western Company. Permanent position with future for responsible aggressive man. Give full resume, age, family. P-5481, Engineering News-Record.

WANTED RECENT Civil or mechanical engineering graduates, general field municipal water supply. Annual increase in salary and bonus. Profit sharing plan. Frequent changes in location. Pitometer Associates, Engineers, 50 Church Street, New York City.

BRIDGE DESIGNERS. Experienced and inexperienced men with a civil engineering degree wanted for a period of about 24 months in the office of a well known organization in Central Pennsylvania. State qualifications, age, salary requirements and availability in first letter. P-5355, Engineering News-Record.

ASSISTANT ENGINEER wanted by the City of Watertown, New York. Salary $4050 to $4530. Retirement, sick leave, vacation and longevity benefits. Experience in municipal engineering preferable. Write or call City Engineer, City Hall, Watertown, New York.

SUPERINTENDENT: TOP man capable taking over entire toll road job including grading, paving, drainage and structures. Excellent opportunity for qualified man. Job located Northern Indiana. P-5474, Engineering News-Record.

CIVIL ENGINEER: Registered Professional Engineer or engineer-in-training. Municipal engineering work in city engineer's office. Experience in highways or structures desirable. Apply 500 Municipal Building, Dayton 2, Ohio.

(Continued on opposite page)

MECHANICAL ENGINEER WANTED

Graduate Mechanical Engineer experienced in pulp and paper maintenance for large progressive mill in Middle Atlantic States. Under 35 years of age. Good salary with excellent opportunity for advancement. Give detailed resume of experience.

P-5431, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

Design engineer senior cost engineer senior office engineer senior

Employment offered in Afghanistan. Work to be on large land development program. Two year contract single status basis.

Write:

Morrison-Knudsen Afghanistan, Inc.
74 New Montgomery St.
San Francisco 5, California

Draftsman Structural Steel Detailers

Good pay—Permanent—Overtime Vacation, holidays. Established firm Jersey City. Our employees know of this ad

P-5531, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

WANTED

Construction Superintendent

for work in Kansas, with experience in institutional and office buildings, industrial type buildings and government projects. Must be capable of taking complete charge of work. State starting salary, age and when available.

P-5521, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

To Employers Who Advertise for Men:

The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered.

When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. Others do not receive the slightest indication that their letters have even been received, much less given any consideration. These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide.

We can guarantee that *Every Advertisement Printed in the Searchlight Section Is Duly Authorized.* Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked, say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes.

We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements.

Classified Advertising Division
McGRAW-HILL PUBLISHING COMPANY, INC.
"Put Yourself in the Place of the Other Fellow"

MECHANICAL ENGINEERS

For company's Equipment Engineering Division located in New York City. Minimum five years' experience designing, selecting and specifying all types of maintenance and shop equipment.

Must know general machine shop practice, garage operations, engine rebuilding, power plant operations, refinery and oil field maintenance equipment sufficiently to be capable of preparing specifications for manufacture, economic and engineering analysis for selection and guidance for tests and inspection of purchased equipment.

Write giving full particulars regarding personal history and work experience. Please include telephone number.

Recruiting Supervisor, Box 13

ARABIAN AMERICAN OIL COMPANY

505 PARK AVENUE
NEW YORK 22, NEW YORK

DESIGN ENGINEERS

Excellent opportunity for Engineers experienced in design of Filter Plants and Water Works—Bridges and Highways. Recent Graduates also accepted. Good living conditions and Bonus and Pension Plan. Include experience, date available, salary desired in first letter. Gannett Fleming Corddry & Carpenter, Inc., Box 366, Harrisburg, Pa.

MECHANICAL ENGINEER WANTED

Graduate Mechanical Engineer experienced in the operation of Fourdrinier paper machines, refining and related equipment for large progressive mill in Middle Atlantic States. Under 35 years of age. Good salary and excellent opportunity for advancement. Give detailed resume of experience.

P-5434, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

DRAFTSMEN

Mechanical Draftsmen for general plant engineering work in large pulp and paper mill. Chemical plant experience in process and piping drafting desirable. Positions permanent. All employee benefits, insurance, vacations, retirement, etc. Send Resume to

Director of Personnel
WEST VIRGINIA PULP & PAPER CO.
LUKE, MARYLAND

POSITIONS VACANT

(Continued from opposite page)

FIRST CLASS, heavy construction superintendent age 35 to 50 able to assume all responsibility reference, past performance required top salary. Ray Hubbard 1615 South Avenue Rochester, New York.

CONSTRUCTION SUPERINTENDENT — For general contractor—experienced on multi-storied, steel-framed office buildings — location, Manhattan—write for interview, giving age, experience, etc. P-5514, Engineering News-Record.

ENGINEER—EXPERIENCED in design, specification writing and report preparation, sewerage, sewage treatment and waterworks. Position in Virgnia. Write in detail—giving education, experience and salary. P-5527, Engineering News-Record.

ENGINEER-DRAFTSMAN: Wanted by large railroad in the South, college graduate in Civil Engineering to fill vacancy in drafting room, handling design and detail drawings for railroad buildings and shop facilities. Experience desirable. Write P-5541, Engineering News-Record.

CIVIL ENGINEER: City of Middletown, Ohio, (Population 36,000) invites applications. Registration as a professional engineer in State of Ohio required. Salary, starting $424.38 per month, with increase after six months and each year thereafter for next three years to final salary of $558.06. Desirable qualifications: Design of Municipal improvements, pavements, sanitary and storm sewers, buildings, retaining walls, supervise field parties and construction projects. Inquiries and personnel record data should be directed to C. A. Boeke, Director of Public Service, Municipal Building, P. O. Box 530, Middletown, Ohio.

DRAFTSMAN — EXPERIENCED structural steel detailer and checker for building construction. Permanent. All employee benefits, paid vacation, insurance, etc. Submit resume and salary desired. Barber & Ross Company 5th & V Sts., N. E. Washington, D. C.

STRUCTURAL ENGINEERING

ARCHITECTURAL ENGINEERING

OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. ***Forty-fourth year. Write today.***

WILSON *Engineering Corp.*

College House Offices—HARVARD SQUARE, CAMBRIDGE, MASS.

POSITIONS VACANT

STRUCTURAL ENGINEER, Permanent, for small progressive structural engineering office in Connecticut. Must have minimum three years experience in structural design. Work includes design of schools—institutional, commercial, industrial structures of reinforced concrete and steel. Opportunity for right man; with possible business participation when proven. Give full details in first letter; education, outline of experience and salary expected. P-5456, Engineering News-Record.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

CONSTRUCTION EXECUTIVE, available as project manager, on large operation, chief estimator for large organization or in other executive position where scope warrants employment of top man, thoroughly experienced on all types of construction and in every phase of general contracting. PW-5074, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT or Project Manager 35 years in heavy construction, most recent on oil refinery and chemical plants. Also on major steel mill expansion in Chicago area. Past experience includes several major office buildings in Chicago as well as two oil refinery units in Europe. Can supply highest references from former employers. Available after Feb. 1st, 1955 am willing to go anywhere, but would prefer the far west or deep south. Reply to PW-5327, Engineering News-Record.

ENGINEER, HEAVY construction, BSCE, 27. Experience: chief of party, form design, field estimates, sub contractor coordination, field supervisions. Responsibility desired. PW-5493, Engineering News-Record.

NAVY CIVIL Engineer Corps Officer being released from active duty in April, BSCE, 25, 4 years experience in plant maintenance and new construction, seeks position with construction firm, preferably in Texas. PW-5298, Engineering News-Record.

COST AND Office Engineer (27) six years industrial construction wants chance to help contractor save time and money. PW-5238, Engineering News-Record.

CIVIL ENGINEER registered, 22 years experience in design and construction of buildings and highway structures seeks responsible position New England area. PW-5513, Engineering News-Record.

CIVIL ENGINEER, BCE degree, age 29, 3 yrs. hydraulic (hydrologic) investigations and reports and 2 yrs structural experience. Desire permanent, responsible office position in northeast, midwest or southwest. PW-5504, Engineering News-Record.

CONSTRUCTION EXECUTIVE with 23 years experience in both field supervision and administration of all types of construction in North America and overseas, including complete new developments consisting of buildings of all kinds, bridges, iarfields, roads, railroads, services, utilities etc., requires supervisory or administrative position. Willing to travel overseas. PW-5534, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT, over 20 years broad experience various types projects. Engineer. Anywhere. PW-5538, Engineering News-Record.

CONSTRUCTION EXECUTIVE age 32 carpenter, B.S.C.E. past 8 yrs. Ass't for general contractor commercial, industrial, public buildings. All phases. Desires position with opportunity to advance and become part owner. PW-5544, Engineering News-Record.

Available Engineer Executive

Fifteen years in charge engineering dept. design construction, operation large electric utility. Ten years investigation reports on diversified projects. Have successfully directed large staff from inception to completion of works. Engineering and construction costs conscious.

PW-5402, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

LEARN ESTIMATING

Complete Building Estimators Course, also Building Labor Calculator for practicing estimators. Thirty-fourth year serving the building industry. For free trial and all particulars write:

TAMBLYN SYSTEM
1420 Gilpin St. Denver 6, Colorado

Engineers—Foremen—Office Men

Learn latest methods to organize and run work. Prepare for the top jobs.
Send post card for details.

GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
411 So. 5th Ave. Lake Worth, Florida

It's Here . . . Contractors, Estimators

The Estimating Book You've Been Searching For!

ESTIMATING PRODUCTION AND CONSTRUCTION COSTS

Never Goes Out of Date

Estimate general construction costs. More Accurate.

Write for 10 day free exam. $15 postpaid from:

THE DALLAVIA CO.
Dept. E 2110 Elmen, Houston, Texas

POSITIONS WANTED

GRADUATE CIVIL Engineer—Reg. Ohio—19 years bridge & building design, detailing & estimating experience with fabricators, consultants, contractors & government. Employed. Desire opportunity for advancement in Ohio, North Central States. PW-5505, Engineering News-Record.

CONSTRUCTION ENGINEER — C. E. Grad. Reg. Prof. Engr. 21 years experience 11 of which as Supt. of Const. Also experienced estimator. Know job pushing, equipment, cost control. Experience about ⅓ building ⅔ heavy—big jobs and small. Age 41. PW-5506, Engineering News-Record.

CONSTRUCTION SUPT. or general foreman 35 years experience in construction of buildings, commercial, industrial and public. From foundation to finish. N Y C or vicinity. PW-5523, Engineering News-Record.

PURCHASING ENGINEER familiar with foundry and forge shop practice and equipment, machining, stampings, welded fabrication, piping, steel, aluminum and copper. Experienced in planning, scheduling, material take-offs, purchasing, contract administration, expediting, stores and receiving. Can set up procedures and design forms. Proven record of developing new sources of supply. Free to travel or relocate. PW-5530, Engineering News-Record.

B.S.C.E. 28. Five years experience in steel bridge and building erection with large fabricator. Field, office, and engineering. Desires to relocate with fabricator-erector or consultant. PW-5529, Engineering News-Record.

B.S.C.E., 32, 6 years experience in all phases of highway engineering. Expert in design and construction of any size highway project. PW-5535, Engineering News-Record.

CHIEF ESTIMATOR general superintendent. Thoroughly experienced all phases of construction industry. Available March 1st. PW-5554, Engineering News-Record.

MILLWRIGHT SUPERINTENDENT available now. Can organize & operate any size job. PW-5555, Engineering News-Record.

WORK WANTED

STRUCTURAL STEEL detailing work wanted by experienced men. Bridge detailing a specialty. Located near metropolitan N. Y. area. WW-5484, Engineering News-Record.

PART TIME WORK WANTED

PART TIME work. Retired licensed structural engineer available for design, detailing and estimating. PTWW-5301, Engineering News-Record.

(Continued on following page)

USED HAULING EQUIPMENT

REAR DUMPS

4—49FD 15 Ton Euclids..each	$ 8,500.00
6—59TD 22 Ton Euclids..each	27,000.00
1—20TD 22 Ton Euclid.......	12,000.00
4—20TD 22 Ton Euclids..each	12,500.00
4—15TD 22 Ton Euclids..each	11,000.00
1— 8TD 22 Ton Euclid.......	12,000.00
10— 8TD 22 Ton Euclids..each	11,000.00
2— 1TD 22 Ton Euclids..each	5,000.00
1— 1TD 22 Ton Euclid........	6,000.00

SHOVELS

1—Bucyrus-Erie—54 B........	$23,500.00
1—Bucyrus-Erie—54 B........	20,000.00
1—1201 Lima 3½ yd.........	25,000.00

SCRAPERS

1—Model 16TDT—23 SH— Twin Power Euclid.......	35,000.00
4—W LeTourneau ....each	5,000.00
1—DW10 Caterpillar—Hydraulic	4,250.00
2—Model C-11 Le Tourneau each	5,000.00
2—Model B Le Tourneau each	12,500.00

TRACTOR

7—HD 19 Allis-Chalmers..each	8,000.00
1—TD 18A International......	7,500.00

MISCELLANEOUS

2—89W Euclid Wagons...each	2,500.00
1—FD Euclid Water-Wagon— 4,000 gal. capacity......	3,500.00
1—FD Euclid Water-Wagon— 4,000 gal. capacity.....	2,500.00

Subject to Prior Sale

EUCLID DIVISION
GENERAL MOTORS CORPORATION
4759 - 14th Ave. S., Minneapolis 7, Minn.
LOcust 4731

SURVEYING INSTRUMENTS

USED • REBUILT • SALE
RENT • REPAIRING

---

expert repairs or complete overhauling by skilled craftsmen on all makes and types. Precision guaranteed.

FINE RENTAL INSTRUMENTS

Reasonable rates, on monthly or yearly basis. All instruments guaranteed to be in first class condition.

David White COMPANY
319 W. Court St.
Milwaukee 12, Wis.

GURLEY

REPAIR SERVICE

Send your instrument to the factory for repair, rebuilding, adjustment. Write today for "Repair Service" leaflet.

W. & L. E. Gurley, Dept. R, Troy, N.Y.

WANTED

WANTED TO BUY

FOR CASH!

Contractor's Equipment, Low Bed Trailers, Shovels, Dozers, Cranes, etc.

Also: Dump Trucks, Trailers, and Euclids.

Will buy one piece or entire lot.

WARREN E. McCARTHY
241 Mystic Ave. Medford, Mass.
Mystic 6-3500

WANTED

TANDEM DRIVE LOWBED TRACTOR FOR 70 TON I BEAM TRAILER

12:00 x 24 16 Ply Rubber

Must Be in Excellent Operating Condition.

W. J. HALLORAN TRUCKING CO.
303 Chapman Street Providence, R. I.

WANTED TO BUY

4000' 15 or 16" CONCRETE FORMS

WILLIAMS CONSTRUCTION CO.
Box 145 Baltimore 20, Md.

WANTED—JOY DRILL

58BH Champion diesel powered blast hole drill.

Frank Swabb Equipment Co., Inc.
313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

WANTED TO BUY

1—20 ton Truck Crane

(late model)

WILLIAMS CONSTRUCTION CO.
Box 145 Baltimore 20, Maryland
Phone—Murdock 6-6600

PART TIME WORK WANTED

(Continued from preceding page)

ESTIMATOR; REGISTERED mechanical engineer; 16 years experience, desires part time work. Cost estimation or design work. Location in Md., Dist. of Col., or Va.; special machinery developed. PTWW-4999, Engineering News-Record.

SPECIAL SERVICES

Appeals Service: Construction Contractors, who intend to appeal decisions of the contracting officer concerning disputed questions of fact under government contracts, are offered complete representative service covering analysis, preparation and processing of appeals. SS-5062, Engineering News-Record.

BUSINESS OPPORTUNITY

For Sale established engineering and surveying business with records of engineering projects and surveys, maps, etc. of property in and around Geneva, New York, for a period of fifty years. Offer includes office furniture and engineering equipment. Wonderful opportunity to acquire an established civil engineering and surveying business, successfully carried on and built up by the late Hubert W. Flaherty and James W. Brennan. Sale to settle estate. Write John F. O'Malley, 435 Exchange Street, Geneva, New York.

WANTED TO BUY

CONSTRUCTION EQUIPMENT DISTRIBUTORSHIP

Should have good, heavy and diversified lines selling to general contractors. Business should be of moderate size in active location.

W-5512, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

ENGINEERING SERVICE

Highly qualified group of licensed engineers and draftsmen will do on schedule long span bridges, thruway type bridges, etc. for engineering firms, state or local highway departments. Experience includes Pennsylvania and New Jersey Turnpikes, New York Thruway, Garden State Parkway, etc.

SS-5379, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

MAKE A HABIT OF READING
"SEARCHLIGHT"

"SEARCHLIGHT" Can Help You!

Hundreds of miscellaneous business problems that confront you from time to time, can be quickly solved through the use of the SEARCHLIGHT SECTION of ENGINEERING NEWS-RECORD.

When you want to buy or sell used or surplus new equipment, want additional capital or have other business wants—advertise them in the SEARCHLIGHT SECTION for quick, profitable results!

What the "SERVICE"* in our name *means to YOU*

The most complete and varied stock of construction and material handling equipment available for RENTAL on the Atlantic Seaboard

PLUS The "Know-How" of over 30 years experience in the proper application of "machine to job". Tell us your problems.

PLUS Complete shop and field service facilities to keep you going

PLUS A sense of responsibility to our customers and a reputation for fair dealing

We Own And Offer FOR SALE AND RENTAL

AIR COMPRESSORS, 75 to 600 ft capacity
BACK HOES
BROOMS, Street and Road
BUCKETS—Clam Shell, Concrete, Dragline, Scraper and Orange Peel
BUGGIES, Concrete, Gas Power
BULLDOZERS and Angledozers
CARRY ALLS or Scraper Wagons
CRANES, Crawler—⅜ to 2 Yard
CRANES—Wheel Mounted—Swing and Stiff Booms
CRANES, Truck Mounted
DRAGLINES
EXTRACTORS—Pile
FINISHERS—Cement Floor
FORK LIFT Trucks
FRONT END LOADERS—Crawler and Wheel
GENERATORS—Portable, Gas, Diesel
GRADERS—Diesel Power
GRINDERS—Surface, Electric and Air—Concrete
HAMMERS—Pile and Extractors
HOISTS—Gas, Diesel, Electric and Air
"HOISTER" TOWERS—Portable for Builders
HOPPERS, Concrete
INDUSTRIAL CRANES—Krane Kars, etc.
LIGHT PLANTS—Gas & Diesel
LIFT TRUCKS—Gas Power
LOADERS—Tractors, Mounted, Wheel and Crawler
MIXERS—Concrete, Mortar, Plaster, Bituminous
PNEUMATIC TOOLS, all types
PUMPCRETE OUTFITS
PILE DRIVING HAMMERS
PIPE LINE EQUIPMENT
PUMPS, Self Priming Centrifugal—1½", 2", 3", 4", 6", 8", 10", Gas and Electric
PUMPS—Diaphragm 3" and 4", single and double
PUMPS—Jetting and Pressure
PUMPS—Pneumatic Sump
RIPPERS or Road Rooters
ROLLERS—Road—3 to 10 Ton, all types
SAW RIGS, Portable
SCRAPER WAGONS, Diesel Powered
SHEEPSFOOT ROLLERS
SHEETING HAMMERS
SIDE BOOM PIPELAYERS
STEAM GENERATORS
SURFACERS—Concrete
SWEEPERS—Street and Road
TAMPERS, Mechanical & Back Filler
TOWERS—Steel Tubular, Hoisting
TOWERS—Jaeger, Portable "Hoister"
WOOD TOWER BUCKETS AND HOPPERS
TOURNAPULLS—Diesel and Scrapers
TRACTORS—Rubber Tired and Accessories, Gas—Diesel
TRACTORS—Crawler, Diesel with Scrapers, Winches and Dozers—Pipe Layers
TRENCHERS OR DITCHERS—Wheel and Ladder Types
VIBRATORS—Concrete, Gas and Pneumatic
WAGON DRILLS
WAGON SCRAPERS
WELDERS—Gas & Electric
WINCHES—Portable and Tractor Mounted

Specialists on rental and repair of McKiernan-Terry Pile Hammers and Extractors.

RENTAL *SERVICE CO.
39 YEARS OF "SERVICE"

Tel. BAldwin 9-3500
20th & Erie Ave.
(Div. Service Supply Corp.)
Philadelphia 32, Pa.

REAL BUYS

See In Our Yard

MICHIGAN TLDT-20 12-½ Ton Truck Crane on factory carrier. Crane & Clam comb. Rebuilt. Excel. con. $10,500

SCHIELD BANTAM 1953 Crawler, 16" pads, Backhoe, 20" bucket. Rebuilt. $8,800

3—WORTHINGTON 315 two-stage port. comp. Diesel eng., elec. starters, mounted on 4 pneums. (Each) . . $3,200

BAY CITY Model 20 Crawler Comb. Shovel, Backhoe and Clamshell mach., gas eng. good oper. cond $4,000

4—WORTHINGTON 315 two-stage port. compressors, gas. eng., elec. starters, mounted on 4 pneums. (Each) $2,200

BYERS 83 Crane and Clam Comb., std. crawlers, 35' boom, gas eng. reconditioned mach. Real buy $6,000

4—WORTHINGTON 210 two-stage port. comps. gas. eng., elec. starters, mounted on 4 pneumatics. (Each) $1,600

OLIVER DG Tractor with Sargent Overhead Loader, good price $2,200

Phone, wire, or write for complete list of quality used equipment.

Construction Equipment

METALWELD, INC.

Hunting Park Ave. and Fox St.
Phila. 29, Pa. BA 6-2600

Save 50%

LATEST OF LATE MODELS TRUCK CRANES

4—FULL 20 TON CAPACITY

MOUNTED ON HENDRICKSON TRUCKS—PURCHASED NEW BY US FROM MANUFACTURER—USED FOR STEEL ERECTION ONLY—HUNDREDS OF DOLLARS SPENT EXTRA ATTACHMENTS—WE CONSIDER GOOD AS NEW PRACTICAL PURPOSES—SALE PRICE FIFTY PER CENT OUR COST—CAN FURNISH BOOMS TO 100 FT. JIBS 15 FT. OR 25 FT.

RENTALS TO APPLY UPON PURCHASE

DONALD B. MAC NEAL, INC.

12100 S. Loomis St. *Pullman 5-3411* Chicago 43, Ill.

DEPENDABLE USED MACHINES

Special:-Universal Jr. 880 port. crushing and screening plant; Buda Diesel motor. Come see it!

Bay City 45 dragline
Link Belt LS-85 crane
Lorain 30 dragline
Northwest truck crane
Bay City 25 backhoe
Link-Belt LS-75 for magnet use
Pioneer 18V port. gravel plant
Hopto hoe for truck mounting
Cedar Rapids 30x18 roll crusher
Koehring 503 crane; Cat. engine
Eagle coal crusher
Pioneer 4 x 10 screen
16 x 16 roll crusher
40' bucket elevator
Waukesha 6 MZR

For rent—Cranes, truck cranes, buckets, frost balls, floats and other accessories.

10002 Southwest Highway **TRACTOR & EQUIPMENT CO.** Oak Lawn, Ill.

Byers 83-CC ¾ yd. truck crane w/100' boom	$15,000.00
Bucyrus 22B ¾ yd crane w/60' boom. . . .	7,500.00
2—210 c.f.m. Gyro-flow compressors (1953)	5,000.00
LF 192 International Harvester tractor w/Martin Lowboy trailer (New 1951)	10,000.00

Shovel, back hoe, clamshell and drag buckets available.

FS-5507, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE OR RENT—EASY TERMS
Rebuilt — A 1 Condition
48B Bucyrus Erie Shovel 2 cy Diesel
Model 25 N.W. Shovel ¾ cy diesel
Caterpillar Auto Patrol No. 12
Caterpillar D8 Bulldozer
Caterpillar Scraper Model 80
3—Caterpillar DW 10's

WILLIAMS CONSTRUCTION COMPANY
Box 145 Balto. 20, Md. Murdock 6-6600

CONCRETE PLANT EQUIPMENT

2—Johnson 150 cubic yard Concrete Plants, 3 aggregate and 1 cement compartment, 2 cubic yard aggregate and cement weight batchers, 520 barrel auxiliary cement bin with truck hopper, elevator and screw conveyor. Outfit has aggregate truck hopper and bucket elevator. Plants include 2 each of Ransome 28S Mixers.

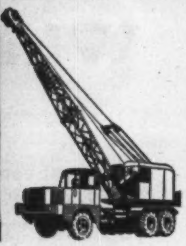
Subject to prior sale

FRAZIER-DAVIS CONSTRUCTION COMPANY

1319 Macklind Avenue, St. Louis, Mo. STerling 1-1950
Box 188—Grahamsville, New York Grahamsville 2861

CRANE RENTALS

19
LORAIN
MOTO CRANES



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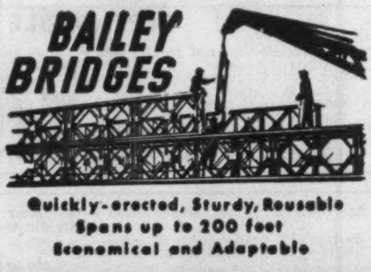

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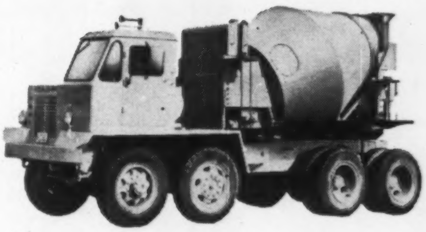
MODEL 300/747—45-ton crane carrier—220" wheelbase. Powered by 200 to 250 HP Gasoline or Diesel Engine with 5-speed transmission and 2-speed auxiliary transmission. 25,000 lb. front axle with 20¼" x 5" air brakes—90,000 lb. tandem rear axles with 20¼" x 7" air brakes—(10) 14:00 x 24, 20-ply tires all around. Hydraulic steering. Approximate weight of chassis, 50,000 lbs. Other models available.



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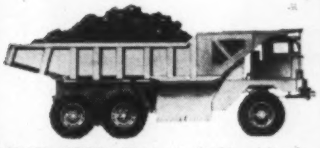
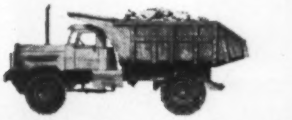


MODEL 55TA—55-ton end dump truck—211" wheelbase. Powered by two 300 HP Diesel Engines with torque converters. 200,000 lb. Dart planetary drive tandem rear axles with 20" x 9" air brakes—50,000 lb. front axle suspended with a hydraulic air strut with 20" x 9" air brakes. Steering by hydraulic power on a center bearing cushioned by captive air in hydraulic air strut. 18:00 x 25, 32-ply tires all around—30 cubic yard rock body. Approximate weight, 96,000 lbs.

MODEL 10-S—10-ton end dump—106" wheelbase. Powered by 156 HP Diesel Engine—14,000 lb. front axle with 17¼" x 3" air brakes—26,000 lb. full floating double reduction rear axle with 16½" x 7" air brakes—12:00 x 20, 16-ply tires all around. Hydraulic steering—6½ cubic yard R/Q body. Approximate weight, 20,000 lbs.



MODEL 30-SL—30-ton end dump truck. Full cab. 184" wheelbase. Powered by 300 to 350 HP Diesel Engine with or without torque converter. 100,000 lb. Dart planetary rear axle with 20" x 9" air brakes. 25,000 lb. front axle with 20¼" x 5" air brakes. 14:00 x 24, 28-ply front tires (16:00 x 25, 24-ply optional)—18:00 x 25, 32-ply rear tires. Hydraulic steering—20" cubic yard Rock body. Approximate weight, 46,000 lbs.

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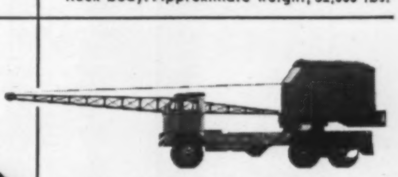

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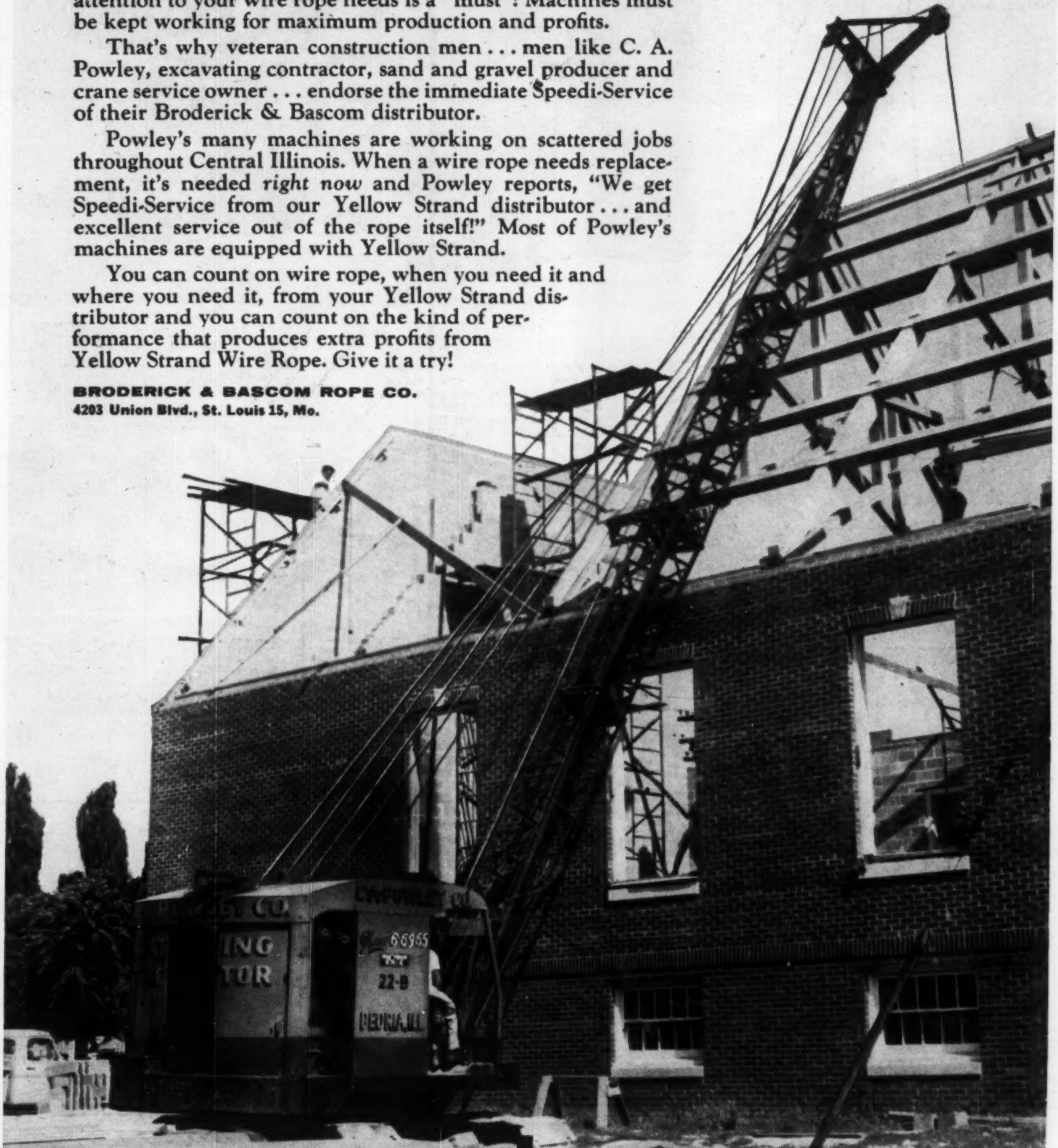

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